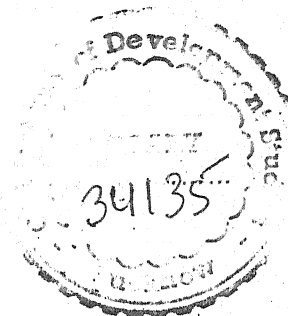


192

# MODEL LAND USE PLAN OF AGRA DISTRICT

(Revised)

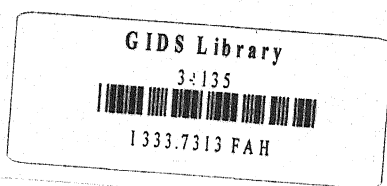


Sponsored by:

**STATE LAND USE BOARD  
DEPARTMENT OF PLANNING  
GOVERNMENT OF UTTAR PRADESH**

PREPARED BY:

**Dr. FAHIMUDDIN  
DR. R C TYAGI**



333.7313  
FAH  
U.P. land utilization  
Model land use  
land utilization

**GIRI INSTITUTE OF DEVELOPMENT STUDIES  
Sector-O, Aliganj Housing Scheme  
LUCKNOW-226 024**

2005

I  
333.7313  
FAH

## PREFACE

The availability of land for various uses is limited. Therefore, utilization and conservation of land resources are important for their sustainable use. Formulation of Model Land Use Plan is an important step for promoting a desirable land use. With this view, State Land Use Board, Department of Planning, Government of Uttar Pradesh, entrusted the Giri Institute of Development Studies, Lucknow to prepare Model Land Use Plan for six districts of Uttar Pradesh, namely, Lucknow, Kanpur, Bareilly, Moradabad, Meerut and Agra. The present report is the Model Land Use Plan of Agra district.

We are highly obliged to Shri S.N. Jha, IAS, the then Principal Secretary, Department of Planning, Government of Uttar Pradesh for sponsoring the task to our Institute. Mr. Anis Ansari, IAS, who has been the Principal Secretary, Department of Planning, after Shri Jha, provided us very useful guidance. We are extremely grateful to Shri Amal Kumar Verma, IAS, the present Principal Secretary, Department of Planning for his valuable guidance on the subject. We feel grateful to Shri Kunwar Fateh Bahadur, IAS, and Shri Navtej Singh, IAS, Secretary, Department of Planning for their guidance and encouragement. We are also extending our thanks to Shri A.N. Mishra, IAS, Special Secretary, Planning for his continuous support in pursuance of the study.

We feel highly obliged to Ms. Mridula Singh, Additional Director, Land Use Board for providing the opportunity to work on this important subject. Her deep and thorough understanding of the subject helped us to analyze the important issues relating to planning for land resources. The other officials of the Land Use Board, particularly, Dr. (Ms) Anandeshwari Awasthi, SRO, Shri Murali Lal, RO, Shri Arvind Kumar Verma, RO and Shri K.B. Lal provided all the necessary support during the study and hence we are highly thankful to all of them.

A Model Land Use Plan can not be prepared without the active support of concerned departments. Shri Vasudev Verma, Additional Director, Department of Agriculture, Shri A.K. Dwivedi, Chief Planner, Department of Forest, Shri Satyavir Singh Dalal, Senior Planner, Town and Country Planning Department and many officials of the Board of Revenue, Forest, Agriculture Departments, Sodic Land Reclamation Project, Directorate of Economics and Statistics have been quite helpful in the preparation of this Model Land Use Plan.

We feel very much obliged to District Magistrate and Chief Development Officer, Agra and other government officials of different Departments in the District for their active participation in the final presentation of the Plan.

The research team of the Institute consisting of Ajai Kumar Singh, Mohd. Kaleem, Ravi Nigam, Vinay Kumar Bisht, Zamir Ahmad, Shubhra Tandon, Sanjai Sharma and Ms. Sweta Yadav remained involved in data collection, processing and computerization. All of them did their job efficiently and deserves our appreciation. Last but not the least, Shri Manoharan K. deserves our thanks for word processing the manuscript efficiently.

Fahimuddin  
R.C. Tyagi

Giri Institute of Development Studies  
Sector O, Aliganj Housing Scheme  
Lucknow 226 024

July 11, 2005

# CONTENTS

	<u>Page No.</u>
Preface	i-ii
List of Tables	v
List of Graphs	vi
<b>CHAPTER I      GENERAL PHYSICAL CHARACTERISTICS</b>	<b>1-21</b>
I.1    Introduction and Location	1-4
I.2    River System and Water Resources	4-8
I.3    Tanks	8-9
I.4    Geology	9-11
I.5    Climate	11-14
I.5.1    Rainfall	12
I.5.2    Temperature	12-13
I.5.3    Humidity	13
I.5.4    Cloudiness	13
I.5.5    Winds	13-14
I.6    Flora and Fauna	14-17
I.6.1    Forests	15-17
I.7    Fauna	17-21
I.7.1    Birds	20
I.7.2    Reptile	20-21
 <b>CHAPTER II      POPULATION AND LAND RESOURCES</b>	 <b>22-36</b>
II.1    Population Structure	22-25
II.2    Classification of Population According to Workers	25-27
II.3    Literacy Rate	28-29
II.4    Projection of Population	29-30
II.5    Per Capita Availability of Land	31
II.6    Land Holding-wise Number of Farmers	32-33
II.7    Area under Different Holdings in Agra District	34-35
II.8    Conclusion	36
 <b>CHAPTER III      TRENDS AND PROJECTIONS OF LAND USE</b>	 <b>37-49</b>
III.1    Introduction	37
III.2    Trends in Land Use Pattern in Agra District	37-40
III.3    Period-wise Shift in Area under Different Land Use Categories	41-44
III.4    Growth Rate of Area under Different Land Use Categories	44-46
III.5    Projected Area under Different Land Use Classes	46-48
III.6    Conclusion	48-49

<b>CHAPTER IV</b>	<b>IDENTIFICATION OF AREAS OF LAND USE PLANNING IN AGRA DISTRICT</b>	<b>50-53</b>
IV.1	Land Under Forest	50
IV.2	Barren Land	51
IV.3	Land Under Non-Agricultural Uses	51
IV.4	Culturable Waste	51-52
IV.5	Permanent Pasture Land	52
IV.6	Area Under Miscellaneous Trees	52
IV.7	Fallow Land	52-53
IV.8	Net Area Sown	53
<b>CHAPTER V</b>	<b>LAND USE PLANNING OF AGRA DISTRICT</b>	<b>54-70</b>
V.1	Status of Forest	54-55
V.2	Plan of Increasing Forest Cover	55
V.3	Methodology	55-59
V.4	Plan of Barren Land Use	59-62
V.5	Plan of Land Area Under Non-Agricultural Uses	62-63
V.6	Plan for Culturable Waste	64-65
V.7	Plan for the Pasture Land	65-66
V.8	Plan for the Miscellaneous Trees	66
V.9	Plan for Current Fallow	67-68
V.10	Plan for Other Fallow	68-69
V.11	Plan for Net Area Sown	69-70
<b>CHAPTER VI</b>	<b>MODEL LAND USE PLAN OF AGRA DISTRICT</b>	<b>71-74</b>
VI.1	Framework of the Plan	71-72
VI.2	Land Use Plan of Agra District	72-74
	<b>Annexure</b>	<b>75-76</b>

## LIST OF TABLES

<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
Table 2.1	Population Characteristics of Agra District (1991)	23
Table 2.2	Age-wise Population Structure of Agra District	24
Table 2.3	Population of U.P. According to Various Age Group	25
Table 2.4	Worker-wise Break-up of Population of Agra District	26
Table 2.5	Classification of Workers	27
Table 2.6	Percentage of Literacy in Agra District and U.P. (1991)	29
Table 2.7	Projected Population of Agra District and Uttar Pradesh: 1990-91 to 2009-2010	30
Table 2.8	Per Capita Availability of Land : Reported and Net Cultivated Area	31
Table 2.9	Changes in Number of Land Holdings in Agra District and Uttar Pradesh: 1985-1986 to 2009-2010	33
Table 2.10	Land Area Under Different Holdings in Agra District and Uttar Pradesh : 1985-86 to 2009-2010	35
Table 3.1	Trends in Land Use Pattern of Agra District	40
Table 3.2	Period-wise Shift in Area Under Different Land Use Categories in Agra District 1980-81 TO 2000-2001	44
Table 3.3	Growth Rate in Area Under Different Land Use Categories in Agra District	46
Table 3.4	Projected Area Under Different Land Use Classes	48
Table 5.1	Plan to Increase Tree Cover on Net Sown Area in Agra District	56
Table 5.2	Area of Different Land Uses Which is to be used for Tree Cover in Agra District Upto 2009-2010	58
Table 5.3	Estimated Financial Requirement for the Proposed Area in Tree Cover of Agra District : 2001-2002 to 2009-2010	59
Table 5.4	Proposed Plan of Barren Land Use in Agra District	61
Table 5.5	Proposed Plan of Increase in the Area of Non-Agricultural Uses in Agra District	63
Table 5.6	Proposed Plan for the Use of Culturable Waste in Agra District	65
Table 5.7	Proposed Plan for the Use of Current Fallow in Agra District	68
Table 5.8	Proposed Plan for the Use of Other Fallow in Agra District	69
Table 5.9	Proposed Plan for the Net Area Sown in Agra District	70
Table 6.1	Framework of Model Land Use Plan	72
Table 6.2	Model Land Use Plan of Agra District: 2000-2001 to 2009-2010	74

## LIST OF GRAPHS

	<u>Page No.</u>
Land Use Plan of Forest - Agra District	77
Land Use Plan of Barren Land – Agra District	78
Land Use Plan of Land Under Non-Agricultural Uses – Agra District	79
Land Use Plan of Culturable Waste – Agra District	80
Land Use Plan of Permanent Pasture – Agra District	81
Land Use Plan of Miscellaneous Trees – Agra District	82
Land Use Plan of Current Fallow – Agra District	83
Land Use Plan of Other Fallow – Agra District	84
Land Use Plan of Net Sown Area – Agra District	85

# CHAPTER I

## GENERAL PHYSICAL CHARACTERISTICS

### I.1 INTRODUCTION AND LOCATION

According to an ancient legend the name Agra is derived from *agra vana*, one of the twelve groves of Brajamandala where Krishna is said to have been sported with his companions when a boy. A later tradition attributes the name to agar, meaning salt-pan in Hindi, implying that the nature of the soil was brackish and indicating that at some period salt might have been produced in this area.

**Location and Boundaries:** The district lies between  $26^{\circ} 44'$  and  $27^{\circ} 24'$  N. Lat. and  $77^{\circ} 28'$  and  $78^{\circ} 54'$  E. Long. To the west of the district lies Rajasthan which with Madhya Pradesh also forms the southern boundary. On the north district is bounded by the districts of Mathura and Etah and on the east by those of Mainpuri and Etawah. The maximum length of the district from west-north-west to east-south-east is 129.50 km. and from north-east to south-west 124.50 km., the average breadth from north to south being about 126.16 km.

The exact area of the district at the time of its formation in 1803 is not known. At the time of the commencement of the Settlement of 1872-79 the total area of the then nine parganas of the district – Etmadpur, Agra, Firozabad, Fatehabad, Farah, Fatehpur Sikri, Pinahat, Iradatnagar and Kheragarh – was 12,13,945 acres (or approximately 3148.69 square km.).

The Trans Yamuna division has a level expanse of upland which is dissected by the inconsiderable effluents of the Yamuna, the main being the Jhima, the Sengar and the Sirsa. Small and isolated ridges of sand occur in this tract the characteristic feature of which is a light yellow loam of great natural fertility. In the south its almost level surface is cut up by deep and extensive ravines which render large areas unsuitable for agriculture. Another feature of this region is the occurrence of kankar, beds which are sometimes exposed or are left covered with a thin layer of soil due to active erosion in the vicinity of the ravines. The whole of the ravined belt is dotted with babul trees and is used as a grazing ground. The khadar or flood plain of the main rivers lies below the ravines and forms narrow belts by the sides of the ravines where tall grass grows in abundance.

The next physical division is a tract lying to the south of the Yamuna which extends as far as the Utangan. It is practically a level stretch of loamy soil, broken only by the Khari river and a drainage channel locally known as the Dahar (or Nahra). A few outcrops occur rising out of the alluvial plain in the west, from Fatehpur Sikri to Kiraoli. Along the course of the Khari Nadi there are ravines which grow longer and deeper as the river flows east-south-eastwards. Until the Yamuna reaches the Agra tahsil and ravines along its course break up the surface only for a short distance from the river line after which they are more marked, the land affected being rendered unculturable for over a mile in breadth. In tahsil Fatehabad they almost disappear for some distance (the highlands gradually sloping down to a low bank of alluvial land) but they soon appear again becoming deeper and broader as the river proceeds onwards. The ravines along the Utangan are similar to those along the Khari.

The third physical division, which is covered by the tahsil of Bah, is an oblong strip of land about sixty-four kilometres long with an average breadth of 12 to 15 kilometres. It is bounded by the Uatangan and the Yamuna in the north and by the Chambal in the south and is scoured by the deep and extensive ravines of these rivers. The level upland, which forms the watershed between them, is very narrow and almost makes a ridge flanked on all sides by broken land. The soil in this watershed is a fine loam which becomes sandy as the ravines on the north are approached, whereas to the south the soil is of a clayey nature. The clay is dark in colour in the west and is known as mar. It becomes genuine stiff clay (termed matiyar) in the eastern portion of the tract becoming somewhat sandy in the extreme east. In this tract the lowlands are more valuable agriculturally than these in the other parts of the district: indeed the kachhar is limited to a narrow, raised strip along the Yamuna though at some places (for example north of the village of Beteshwar in the north and north of village Khilaoli in the east) there are broad stretches of fine rich soil. The lowlands of the Chambal are extensive and produce magnificent crops because they are annually enriched with silt brought down by the rivers.

The fourth natural division of the district is that part of the Kheragarh tahsil which lies to the south-west of the Utangan. It is drained by several watercourses and is flanked by a spur of the Vindhya which runs along its northern boundary. Sandy and clayey soils are generally found in this tract which is dotted with numerous isolated hills. The water-table is near the surface but the nature of the underlying strata renders irrigation difficult. Due to the character of the soil, this tract differs from the rest of the district. Here the loan (dumal) is not only inferior in quality but also very limited in extent.

The hilly tract south-west of tahsil Agra, which occupies parts of tahsils Kiraoli and Kheragarh, may well be considered a fifth natural division of the district. The hills belong geologically to the Upper Vindhyan system including their lowest (the Kaimur group) as well as their highest (the Bhandar group) beds. The Bhandrauli and Fatehpur Sikri spurs are the two parallel but broken ridges of Vindhyan sandstone running south-west to north-east. The Bhandrauli range starts from the village of Churiyari and terminates near the village of Saunauthi in the east of tahsil Kiraoli while the Fatehpur Sikri ridge starts from the village of Bahrauli and extends to the village of Khera near the south-western boundary of the tahsil. The elevation of these ridges does not exceed 150 feet above the surrounding plain. The rocks vary in colour from red to grayish-white, sometimes having a bluish tinge, as in the villages of Dhanauli and Ninwaya. The Fatehpur Sikri ridge, well known for its quarries, has supplied red sandstone for the constructing of forts, palaces and mosques in Agra and Delhi.

The hills in tahsil Kheragarh are higher and well-defined, the highest point being Usra hill which is 810 feet above sea level. There are other less high ridges and hills, the most prominent being those lying to the east of Bargaon Khurd, to the east of Naya Gaon, near Nasaua, near Khohara and near Udaina.

## **I.2 RIVER SYSTEM AND WATER RESOURCES**

The most prominent physical feature of the district is the river Yamuna with its tributaries, the Chambal and the Utangan, which in their turn have many other minor streams as their tributaries. These effluents form a broken chain of pools in summer but assume considerable volume during the rainy season, the velocity depending on the nature of the rainfall. During the monsoon the upper portions of the courses of these streams have low and shelving sides but their banks become more abrupt as they

approach the bigger rivers. They flow from north to south in the north of the Yamuna but to the south of the river they move from west to east.

**Yamuna** - The Yamuna, the chief river of the district, is personified in Hindu mythology as Suryatanaya, the daughter of Surya (the sun god), as Yamasvasa, the sister of Yama (the lord of death) and as one of the wives of Krishna. Another popular name of the river is Kalindi. It is said that on its banks the rishi Agastya underwent penances and austerities, King Bharat performed over 300 horse sacrifices and Shantanu 7 big sacrifices and Sahadeva distributed lakhs of gold coins.

The first appearance of the river is in the north of tahsil Kiraoli where it forms the boundary of the district for some distance, separating the tahsils of Agra and Kiraoli from the district of Mathura. Making a convex bend it flows south for a mile or two and then turns in an easterly direction forming the boundary between the northern tahsils of Firozabad and Etmadpur and the southern tahsils of Fatehabad and Agra. In the extreme east of tahsil Fatehabad receives the waters of the Utangan and continues its course along the northern boundary of tahsil Bah, dividing it from the districts of Mainpuri and Etawah. From village Khilaon the Yamuna finally leaves the district and passes into the district of Etawah. That the river has an extremely meandering course in the district is evinced by the fact that although its total length in the district is 240.70km., the distance (as the crow flies) from its point of entry to that of its exit is only half that length. Its course is marked by a wide belt of calcareous ravines which get steeper and wider as it flows from west to east, the only break being a six-mile stretch near Etmadpur Madra. Here the old high bank of the river makes a large loop enclosing a tract of heavy alluvial soil.

Generally the banks of the river are firm, steady and stable and are scoured by many ravines but a strip of alluvial flood plain of varying width occurs between the cliffs and the river. The variation in the width of the main stream is from 500 feet to a quarter of a mile and the normal velocity is nearly three and a half kilometres an hour but during the rains it rises to seven and a half miles.

### **TRIBUTARIES OF YAMUNA**

**Jhirna:** The first tributary of the Yamuna in the district is the Jhirna (also known as the Karwan or the Karon) which joins it in the north. The stream enters the district near the village of Naharria which is in the north of tahsil Etmadpur. Its course continues in a southerly direction till it joins the Yamuna near Shahdara, a few miles from Agra. The area adjacent to the site where the stream enters the district is scoured by ravines. Another stream, also called the Jhirna, appears during the rains and flows along the common boundary of the tahsils of Firozabad and Etmadpur but it dries up in summer and is of little importance.

**Sirsa:** Another northern tributary of the Yamuna is the Sirsa which enters the district from district Etah, flows south-east in an ill-defined course and, after traversing some eighteen kilometres, leaves the district near the village of Narki which is on the eastern border of the tahsil of Firozabad. In the summer it dries up but during the rainy season it swells and frequently inundates the low and marshy land along its course.

**Sengar:** Another northern tributary of the Yamuna which traverses the district is the Sengar. It is an insignificant stream which, after flowing parallel to the Sirsa for about eleven kilometres, leaves the district near village Kitla and passes into the Mainpuri district.

**Utangan:** In this district the only southern affluent of the Yamuna is the Utangan or Banganga. It enters the district at the south-western corner to tahsil Kiraoli, near the village of Sarauli. It separates the tahsils of Fatehabad and Bah and joins the Yamuna at the village of Rihawali, sixteen kilometres east of Fatehabad. The main characteristic of this river is that it has a shallow bed of shingle and sand. During the rainy season it swells to a fair size, frequently inundating the low marshy land along its course and becoming liable to floods though it shrinks considerably during the summer. It proceeds east between high banks of stiff soil cut up by ravines and changes its course several times. A channel was made in 1848 near the village of Sarauli (in tahsil Kiraoli) for diverting the waters of the Fatehpur Sikri canal but the river appropriated this new channel for itself in order to find a way into the Khari. It retained this new course for over twenty years causing frequent floods. In 1885 it broke through its northern bank and destroyed the villages of tahsil Kiraoli and the adjoining fields. The flood of 1891 necessitated the training of the river and it was diverted to its old course to which it has adhered ever since. Several small tributaries feed the Utangan, the Kavar (or Goela) being the first to join it in this district which it enters in the south-western part of tahsil Kheragarh. After flowing in a north-easterly direction it passes from the villages of Jagner and Singaich to the Vindhyan hills and then bends eastwards to join the Utangan near the village of Ghosiana. The Kavar is also fed by some small affluents such as the Chulhi, Lohenri and Jhanjhan which are insignificant watercourses. During the hot weather they dry up completely but attain an air size during the monsoon. The Utangan is joined by the Parbati in the south of tahsil Kheragarh, a stream of a considerable size which flows into the district from the north-west.

**Khari:** This river is the only feeder of the Utangan in the north. It enters the district from the south-west of Fatehpur Sikri and proceeds north for a short distance till it meets the Orinia, another stream derived from numerous small channels which carry off the drainage from Bharatpur (in Rajasthan). From the junction of these two streams the Khari bends eastwards and after flowing under a bridge on the Fatehpur Sikri road it turns south-east at Singharpur and, passing the villages of Janegara and Akola in tahsil Kiraoli, demarcates the boundary between the tahsil of Kheragarh on the south and those of Fatehabad and Agra on the north. It finally meets the Utangan at the village of Motipura in tahsil Fatehabad. It flows in a shallow channel between low banks in the upper portion of its course but in its lower courses it is flanked by precipitous ravines. During the rainy season it is swollen by floods but in summer it shrinks to only a ribbon of water.

**Chambal:** This river rises in the northern slopes of the Vindhya. Tasord is the village in the extreme west of tahsil Bah near which the river first touches the district along the boundary of which it flows as far as the border of district Etawah. The banks of the river are steep and high but there is a flood plain below the banks in which the river takes its course. During the rains it is fed by many torrents and consequently it becomes a wide and turbulent stream, frequently inundating the surrounding areas but in summer it shrinks to a thread of water winding along a sandy bed. Its velocity varies from three to nine kilometres an hour according to the season and it is not navigable because of the variation in the depth and volume of its water.

### **I.3 TANKS**

There are thirty-five tanks benefiting an area of 11,263 acres round about Jagner in tahsil Kheragarh and a big reservoir in the Agra tahsil, covering an area of 764 acres

and holding 290 million cubic feet of water. These tanks belong to the irrigation department and are the only source of irrigation in this area, the water being released at the time of the rabi sowing. This water helps the soil to become fertilized by inorganic matter coming from the catchments areas and makes it fit for producing good rabi crops without the need of any subsequent irrigation.

The Keetham reservoir in tahsil Agra was constructed with the purpose of reclaiming the soil. It holds 290 million cubic feet of water and serves an area of 764 acres. In dry years, when the Yamuna fails to yield sufficient supplies of water for the waterworks of Agra city, this reservoir meets the shortage that occurs and it has become the centre of recreation and pisciculture in the district. An area of about 200 acres of the horticulture department is also irrigated by its waters. Licenses for fishing in the reservoir yield about Rs.20,000 annually.

#### **I.4 GEOLOGY**

Practically the whole of the Agra district is covered by Pleistocene to sub recent alluvial deposits of the rivers of the Indo-Gangetic system which have traversed this area. A narrow strip of outcrops of Vindhyan sand-stone, running in a north-eastern to south-western direction, is exposed in the south-western part of the district. The deposition of the alluvium commenced after the final upheaval of the Himalayas and has continued all through the Pleistocene age up to the present.

The alluvium in the district consists of intermeddled deposits of sand, silt and clays. At place calcareous concretions are associated with this alluvium in the form of kankar and these are worked, when found suitable, for use as road-metal and for building purposes.

The Vindhyan sandstones, which are in many cases ferruginous, vary in colour from white and flesh-colour to deep-reddish brown. These are found as both freestones and flagstones and are often very homogenous and soft and as such are suitable for elaborate the delicate carving.

**Mineral Deposits:** Kankar, brick and pottery-clays are the useful materials which are commonly obtainable from the tract occupied by the alluvium while building stone is quarried extensively from the Vindhyan sandstone formations.

**Kankar:** Calcareous concretions (locally known as kankar) are found throughout the district and occur both in block and in nodular forms. Extensive beds of the former (known as dant) are present in the ravines along the Chambal in tahsil Bah. The palace of the raja of Bhadawar, which is at Pinahat, is one of the buildings made of this material. Kankar is also burnt for the production of lime. The nodular form is found throughout the district but the quality varies from place to place, the more common variety being the bichhua.

**Brick and Potter's Clay:** Brick and potter's clay are found all over the district and are used for the manufacture of bricks, the most common material for house building in these parts. All urban and bigger rural centres not in the hilly regions of the district have their own brick-kilns which are located on their margins along the roads which radiate from them.

**Building Stone:** White, buff, pink, red and brown speckled Vindhyan sandstone is found in the south-western part of tahsil Kheragarh and in tahsil Kiraoli, the best variety being quarried in Tantpur. Ghaskata, Baghuar, Basai-Jagner, Naya Gaon and Dhanina. Here big blocks for door-posts, pillars and beams and thin slate-like slabs for paving and

reefing are obtained in large quantities. Small pieces for ordinary building purposes are found extensively in the hills and in villages which are near sandstone outcrops. Some quarries, such as those at Naya Gaon and Dhanina and the Nauri and Medhi hills, yield hard quartzite blocks that can be made into millstones, oil-presses and the like. Though good for ordinary uses, the stone from Kiraoli, Bhandrauli and Fatehpur Sikri does not stand carving. Some of the beautiful edifices of modern and mediaeval times which are seen in and around Agra, are built of red sandstone from these quarries, the durability of the material being tested by centuries of exposure to the elements.

**Ground Water:** On the whole in the alluvial plain of the district, which lies between the Yamuna and the Chambal, the water-table is fairly low (approximately eighty feet from the surface on an average). Gravel beds have been found near Agra when wells have been sunk at comparatively shallow depth but when they are sunk fairly deep, clay beds-between which underground water is stored are reached, making the construction of wells very difficult and costly.

## **I.5 CLIMATE**

The district has, on the whole, a dry climate except during the monsoon months. The summer is hot and the total annual rainfall is comparatively less than in the neighbouring districts to the east. The cold weather period is from December to February and the hot season covers the period from March to about the middle of June, followed by the rainy season which goes on till the end of September. October and November are the transitional months.

### **I.5.1 RAINFALL**

The average rainfall in the district is 654.5 mm. (25.77") in a year. The rainfall decreases in general from the south-east to the north-west, 90 per cent of the annual rainfall being received during the monsoon season and nearly half of the annual rainfall being received during the monsoon season and nearly half of the remaining 10 per cent being accounted for by the winter rains. August is the month with the maximum rainfall which is slightly less than a third of the total annual rainfall. The variations in rainfall from year to year are large. During the ninety-year period from 1901 to 1990, the highest annual rainfall, amounting to 158 per cent of the normal, was received in 1949. The year with the lowest rainfall in the district, when it was only 30 per cent of the normal, was 1918. Again in this period, less than 80 per cent of the normal rainfall occurred in the 11 years from 1901 of which two were consecutive but at individual stations there have been even four or five occasions when two consecutive years had less than 80 per cent of the normal rainfall. Three consecutive years of low rainfall have also occurred at one or two stations. The figures also indicate that the rainfall in the district was between 400 and 900 mm. in forty years out of ninety.

### **I.5.2 TEMPERATURE**

The only meteorological station in the district is at Agra the meteorological data of which may be taken as being typical of the weather conditions prevailing in the district. The hot weather begins when temperatures rise rather rapidly in March, May being the hottest month when the mean daily maximum temperature is 41.1°C. (106.5° F.). On individual days in this month and in June the day temperatures may reach over 48°C. (118° F.). The nights also become oppressive and continue to be so even in the monsoon months. With the onset of the monsoon after the middle of June, the day

temperatures decrease by about 5° or 6° C. but the night temperatures remain high. In October day temperatures remain more less the same as in September but nights become cooler. From both day and night temperatures drop steadily and in January, the coldest month, the mean daily maximum temperature is 22.5°C. (72.5° F.) and the mean daily minimum is 7°C. (44.6° F.). In association with cold waves, which affect the district in the wake of passing western disturbances, minimum temperatures sometimes drop as low as below the freezing point of water and frosts occur frequently, particularly in January and early February.

### **I.5.3 HUMIDITY**

Except during the rainy months the air is generally very dry, particularly in the summer months and in the afternoons, when the relative humidity is often less than 20 per cent. The high humidity in the monsoon season, coupled with the increase in the temperature during protracted breaks in the rainy season, renders the heat extremely trying.

### **I.5.4 CLOUDINESS**

In the winter and summer months the skies are generally clear or lightly clouded but in the cold season, when the district is affected by passing western disturbances, cloudiness may increase for a day or two. In the monsoon season the skies are generally moderately to heavily clouded.

### **I.5.5 WINDS**

Winds are generally light but in the latter half of summer and the early monsoon season they strengthen a little. In the summer months they blow from directions

between south-west and north-west. In the post-monsoon season and the winter months, the direction of the winds in the morning is the same as that in the summer and in the afternoons northerly or north-westerly winds predominate.

**Special Weather Phenomena:** The highest incidence of thunderstorms and dust storms occurs in the period of April to June, squalls being caused at times which are often violent. Some of the thunderstorms are dry but others are accompanied by heavy rain and sometimes even by hail. Thunderstorms also occur in association with western disturbances in the winter months. The rainfall in the monsoon season is occasionally associated with thunder. Occasional fogs occur in the winter season.

## **I.6 FLORA**

### **BOTANICAL DIVISIONS AND NATURE OF VEGETATION**

Botanically the district can be divided into three divisions: the ravined lands along the Yamuna and the Chambal, the non-ravined lands including the Yamuna-Chambal doab and the xerophytes areas of tahsil Kheragarh. In the first, xerophytes shrubs and stunted trees are also met with, the most common species being reonj (*Acacia leucophloea*), cheonkar (*Prosopis spicigera*), kins (*Capparis horrida*), pilua (*Salvadona oleoides*), arusa (*Adhatoda vasien*), khajur (*Phoenix species*), hingota (*Balanites roxburghii*), kari (*Dichrostachys civera*), kakraunda (*Carissa specigera*), chapat (*Grewia flavescens*), kairukha (*Diosphyros cardifolia*), makoh (*Zizyphus oenoplia*), jharberi (*Zizyphus nuiaria*) and ber (*Zizyphus xylocarpus*).

The tops of the ravines are arid and barren and contain the more xerophytes species like kakril (*Capparis aphylla*) whereas the nullah beds and sides carry

comparatively more vegetation of a less xerophytes character. The first six species that grow in the ravined lands are also found along the nullah beds and milder slopes. The vegetation is denser and richer in the parts of the ravines near the rivers but the parts further away are either barren or sparse in vegetation. In such areas useless grasses like safed lappa (*Aristida adscensionis*) are found along with patches of bhanjura (*Aphudemutica*), chhoti jargi (*Bothriochloa pertusa*), jargu (*Dichanthium annulateum*), and mueel (*Ischilema lexioides*), dab (*Demostachya cypinnata*), anjana (*Ceuchrus ciliaris*) and doob

The ravines along the left bank of the Yamuna are less barren than those in the Yamuna-Chambal doab and on the right bank of the Chambal pilua (*Salvadora obovata*), occurs profusely and grows to a large size. The Yamuna-Chambal doab is almost devoid of any of these forest trees and is under cultivation. Grove lands of mango, khini (*Manilkara hexandra*) and buron (*Krantaeva religiosa*) often occur in this area.

In the xerophytes areas of tahsil Kheragarh the same xerophytes species are found as in the ravined lands, the southern part of this area being almost a desert. Forest plantations of babul, sheesham (*Dalbergia sissoo*), siris (*Albizia lebbek*) and neem (*Azadirachta indica*) have been raised in blocks in all these three botanical divisions.

### **I.6.1 FORESTS**

The forests of the district are of the dry deciduous type owing to the low average rainfall. The growing period is limited to the three monsoon months of July, August and September and growth in the rest of the season is not very perceptible. The forest area of the district falls into four categories. The first is the protected forest along the canals (268 acres); the second is the reserved forest (7,975 acres); the third is the unclassed

forest and the waterlands (44,978 acres): and the fourth consists of roadside avenues (96.28 km.) which are controlled by the forest department.

The protected forests mainly cover canal plantations on both sides of the Agra canal system. They are narrow, artificially raised stripes of vegetation running along the canals. The chief species raised here are vegetation running along the canals. The chief species raised here are babul, neem, sheesham, jamun (*Syzygium cumini*) and mango and the common species siris, arru (*Alanthus excelsa*), amaltas (*Cassia fistula*), papri (*Holoptelea integrifolia*), kanj (*Pongamina glabra*) and tamarind. The less common varieties of trees that are grown here are kachanar (*Bauhinia variegata*) and siris. Generally sheesham, mango and siris are found growing in good soil and babul and jamun in less fertile soil.

The reserved forests occur mostly on strips of land of varying width lying along the banks of the Yamuna which are cut up in gully formation and ravines. The ravines abbot on the edge of the cultivated area and become deeper and larger as they approach the river. These areas were acquired by the government after payment of compensation to the owners during the period 1921 to 1923 in order to conserve the soil. As the results were encouraging, soil conservation schemes have been extended to large areas. The type of vegetation varies from place to place and the common species in this region are reonj (*Acacia leucophloca*), cheonkar, farash (*Tamrix auriculata*), babul, bargad (*Ficus indica*) and pipal (*Ficus species*). Shrubs like hins (*Capparis horrida*), hingota, makoh and karaunda (*Carissa spinarum*) are bound and khajur (phoenix species) also occurs here and there. The unclassed forests vested in the forest department after the abolition of zamindari in 1952 but a major portion of the area under these forests is overrun by ravines which are barren, arid and in various stages of erosion. These forests occupy

7,451 acres in tahsil Kheragarh, 3,035 acres in tahsil Kiraoli, 4,163 acres in tahsil Etmadpur, 3,781 acres in tahsil Firozabad, 22,519 acres in tahsil Bah and 4,088 acres in tahsil Fatehabad. The vegetation met with is of the same type as in the reserved forests. The roadside avenues, which have usually been developed along the national highway, are controlled by the forest department and, apart from providing shelter against the high temperature prevailing in the hot weather and absorbing the force of dust storms, add to the beauty of the countryside. The total length of such avenues is 96.28 km. of which 28.22 km lie along the Agra-Gwalior road, 21.58 km. along the Agra-Mathura road and 46.48 km. along the Agra-Tantpur road.

A regular scheme of afforestation was introduced in the district under the First and Second Five-Year Plans, 3,814 acres being planted in 1954-55 and 7,146 acres from 1956 to 1959. There are some grass preserves here also which are under the charge of the forest department. In recent past, the forest area of district Agra was 39,550 hectares in the year 1980-81 and was 8.30 per cent of the reporting area of the district. It increased to 11.41 per cent of the reporting area of the district in 2000-2001 and reached to 45,437 hectares in the same year.

## **I.7 FAUNA**

The wild life of the district is more varied to the south of the Yamuna, particularly in the neighbourhood of the ravines along this river and the Chambal and in the hill tracts adjacent to Fatehpur Sikri and Kheragarh but animals and birds are not found in great numbers due to the lack of cover and the sparseness of vegetation. The species met with are those that prefer wide open spaces rather than dense jungle. The most commonly seen animal is the nilgai or the blue bull (*Boselaphus tragocamelus*). It is

neither bovine nor blue in colour as its name erroneously suggests but is an antelope of a large size. It has hitherto enjoyed immunity on account of its name (as Hindus, who hold the cow sacred, do not kill this animal because they connect it with the cow) but the villagers have now realized its capacity for destruction and they do not object to its being killed by shikaris. Another kind of antelope which inhabits the plains of the district and is found in this region but is not very common, is the black buck (*Antelope cervicapra*). The chinkara or the Indian gazelle (*Gazelle bennetti*), which is also called the ravine deer, is found mostly in the ravines, the arid areas and the broken country along the Yamuna and the Chambal. It does not occur in large numbers and is getting extinct on account of indiscriminate shooting. The chital (*Cervus axis*) is not common to this place but has been introduced into some forest blocks such as Artauni and Surdas. The sambar (*Cervus uricolor*) was also brought into a few of the forest blocks here but is rare. The pig or wild boar (*Sus porcinus*) is very common and is rare. The pig or wild boar (*Sus porcinus*) is very common and is found near the forest blocks or ravines. Of carnivorous animals the most common are the hyena and jackal (*Canis aurous*) is very common and is found near the forest blocks or ravines. Of carnivorous animals the most common are the hyena and jackal (*Canis aurous*) which are not generally sought after by shikaris. The former abound in the hill tracts and are killed by local hunters. Foxes (*Vulpes bengalensis*) are sometimes seen but do not appear to be very common. Panthers are rare and are found mostly near the Jagner areas. They live mostly on domestic animals or the young of the nilgai. Tigers are also rare and sometimes cross over from the Gwalior area. The purha (hog deer) is seen occasionally in the jungles along the ravines. The tortoise is frequently to be seen in the Yamuna and the Chambal.

The forests have a small population of wolves which are also dying out because of the sparseness of the vegetation and ruthless shooting. Efforts to preserve the wild life of these parts are being made by the forest department by strictly enforcing the game laws of the Indian Forest Act of 1927 and preventing random killing. Only restricted permits are issued to recognized shikaris for shooting destructive animals inside the afforestation areas and young plantations. The forests in tahsil Etmadpur are thin and so the number of wild animals there is small and though jackals and foxes are generally seen, they seldom cause any harm to human life. The nilgai is found in small numbers in the south-east of this tahsil. Other animals which are common are hares, wolves and wild cats.

Nilgais are found in a large number of all over tahsil Firozabad and especially in the villages along the rivulets. Due to indiscriminate killing in the past the number of black bucks has dwindled and they are very scarce now. Leopards and tigers, frequently found in the past in the Jagner circle (in tahsil Kheragarh) are now rare. Wolves and hyenas are generally found in the Dang area but a large number has been killed by Shikaris. Deer and nilgai, which cause great damage to the standing crops, are also found in great numbers in tahsil Firozabad.

In tahsil Kiraoli, leopards have also begun to frequent the Yamuna's banks near Mangraul Gujar and Runkata where afforestation is in progress. Nilgais are also found in this area and are very destructive.

There is a variety of wild life to be seen in the part of the country covered by tahsil Bah. Wild animals, including leopards, abound in the ravines of the Yamuna and the Chambal but due to indiscriminate killing, the number of leopards is gradually decreasing. Tigers are also seen in this region but their appearance is rare, the other carnivorous animals generally seen in the ravines being hyenas, wolves, jackals and foxes. The

ravine deer is abundant in almost all parts of the ravines and the uplands. The nilgai is generally found in parts of the tahsil adjacent to the ravines.


Panthers are not found in tahsil Fatehabad but they come in occasionally from across the Rajasthan border. Deer, nilgais, pigs, foxes, jackals and hares are found in almost all parts of the ravines and they cause much damage to the crops.

### **I.7.1 BIRDS**

A variety of birds including the adjutant and the crane was found in the district in the past but the number has gone down because of the openness of the tract and the sparseness of the vegetation. The forest department is trying to preserve the feathered species by enforcing strict protection.

The most common among the game birds is the partridge (*Francolies pondicerianus*) which occur everywhere and is locally known as that. Other types of partridge, such as black partridge or kala titar (*Francolines vulgaris*), are found mostly near the forest blocks in the ravined lands. Painted partridge, also called kala titar (*Francolines pictus*), occur in the ravined lands of tahsil Bah.

### **I.7.2 REPTILES**

The varieties of snakes (suborder Serpentes or Ophidian) that are found in the district are the ajgar or python (*Python molurus*), domuhi or sand-boa (*Eryx johani*), Russell's sand-boa (*Eryx conicus*), dhaman, racer or rat snake (*Ptyas mucosus*), wolf-snake (*Lycodon aulicus*), water-snake (*Natrix piscator*), rakat-ansi (*Coluber diadema*), striped keelback (*Natrix stolata*), black-barred snake (*Oligodon arnensis*), burrowing or blind snake (*ATyphlops porrectus*) – a  worm like snake – the cobra (*Naja naja*), the

krait (*Bungarus caeruleus*), *Coluber ventromaculatus*, *Liopeltis calamaria*, *Coronella brachyura*, *vipera russelli*, phoorsa (*Echis Carinata*), paniwala (*Tropidonotus piscator*), kankutti pambu (*Dryophis mycterizans*), sand-snake (*Psammophis leithei*) and kawriwala (*Lycodon aulicus*). Among the lizards (sub-order Sauria or Lacertilia) that are commonly found in the district are the goh or monitor lizard (*Varanus monitor*), the house gecko (*Hemidaetilus flaviviridis*), the tuberded gecko (*Heimidactylus brooki*), the girgit or the garden lizard (*Calotes versicolor*), the sping-tailed mastigure "Oosarsanda" or snada (*Uromastix hardwickii*), bamani (*Riopa purctata*), the stripe skink (*Mabuya dissimilis*) and *Ophisops jerdoni*.

Among the order of Testudines or Chelonia, three species of tortoises are common in the district, the Yamuna kachhua tectum) (which is mainly found in the Yamuna), the patar (*Trionyx gangeticus*) and the pond turtle (*Lissemys punctata*), *Geoclemys hamiltoni*, *Hardella thurgi*, *kachuga dhongoka*, *Kachuga kachuga*, *Testudo elegans*, *Testudo eongata* being found in the lakes, ponds and rivers.

Two species of crocodiles (order Loricata or Crocodilia) are found in the district-gharial or long-snouted crocodile (*Gavialis gangeticus*) and magar or broad-snouted crocodile (*Crocodilus palustris*) both of which inhabit the Yamuna and the Chambal and can be seen lying near the banks of these rivers in winter but their number is fast decreasing.

**Fish:** The rivers and tanks of this district abound in fish of the ordinary species such as rohu (*Labeo rohita*), hilsa (*Hilsa ilishal*), bechwa (*Europiithys vacha*), anwari (*Mugil Sp.*), karaunch (*Labeo calbasu*), nain (*Cirrhina mrigala*), bhakur or katla (*Catla catla*), parhen (*Wallago attu*), tenger (*Mystus seenghala*) and belgagra (*Rita rita*).

## CHAPTER – II

# POPULATION AND LAND RESOURCES

### II.1 POPULATION STRUCTURE

According to census of 1991, the total population of Agra district was 27,51,021 and the total population of Uttar Pradesh was 13,91,12,000. Thus, 1.98 per cent of the state's population was living in Agra district. Out of total population of the district, 15,01,927 (54.60 per cent) were males and 12,49,094 (45.40 per cent) were females. The total urban population of the district was 11,11,086 (40.39 per cent), while rural population of the district was 16,39,935 (59.61 per cent). The urban population of the district was 40.39 per cent and was higher than that of state's urban population of 19.84 per cent. Simultaneously, the population residing in rural areas 16,39,935 (59.61 per cent) was less than the state average of 80.16 per cent. According to the Census 1991, the scheduled Castes population, was 6,38,333, which was 23.20 per cent of the total population of Agra district. The total population of Scheduled Tribes in the district was 266, which was 0.01 per cent of the total population of the district and was almost negligible. The female population of the district was 45.40 per cent. The sex ratio was 832, which was slightly below than the sex ratio of the state, which was 879. The density of population was 683 per sq. km. which was higher than the density of population of state 473 per sq. km. (Table 2.1).

It has been found that 40.33 per cent of the district population belonged to age group below 15 years. A section of district population which belonged to working age group of 15 to 59 years was 54.04 per cent. The population in age group of 60 years

Table – 2.1: Population Characteristics of District Agra (1991)

Sl. No.	Items	Agra	U.P.	% to U.P.
1.	Population	2751021 (100.00)	139112000 (100.00)	1.98
2.	Male	1501927 (54.60)	74037000 (53.22)	2.03
3.	Female	1249094 (45.40)	65075000 (46.78)	1.92
4.	Rural	1639935 (59.61)	111506000 (80.16)	1.47
5.	Urban	1111086 (40.39)	27606000 (19.84)	4.02
6.	SC	638333 (23.20)	29276455 (21.05)	2.18
7.	ST	266 (0.01)	287901 (0.21)	0.09
8.	Sex Ratio*	832	879	
9.	Density**	683	473	

\* Per Thousand of male

\*\* Per sq. km.

Source: Statistical Bulletin (1999).

and above was 5.63 per cent. Out of the total population of the district, 15,01,927 were males and 12,49,094 were females. In male population of the district, 39.42 per cent belonged to age group of below 15 years, 54.73 per cent to age group of 15 to 59 years and 5.85 per cent to age group of 60 years and above. In female population of the district, 41.42 per cent belonged to age group of below 15 years, 53.21 per cent to age group of 15 to 59 and 5.37 per cent to age group of 60 and above. The urban population of Agra district was 40.39 per cent of the total population of the district and 59.61 per cent of the population residing in rural areas of the district. 37.53 per cent of the urban population was in age group of below 15 years, 57.72 per cent in working age group of 15 to 59 years and 4.75 per cent urban population was of 60 years and above age. 42.32 per cent of rural population was in age group of below 15 years, 51.55 per cent

population to working age group of 15 to 59 years and 6.23 per cent of rural population was in age of 60 years and above (Table 2.2).

Table. 2.2: Age-wise Population Structure of Agra District

(1991)

Age-Group	Male	Female	Total	Rural	Urban
0-4	205464 (13.68)	187114 (14.98)	392578 (14.27)	251238 (15.32)	141340 (12.72)
05-9	205163 (13.66)	178246 (14.27)	383409 (13.94)	237627 (14.49)	145782 (13.12)
10-14	181433 (12.08)	152015 (12.17)	333448 (12.12)	203516 (12.41)	129932 (11.69)
15-19	160856 (10.71)	114667 (9.18)	275523 (10.01)	157434 (9.60)	118089 (10.64)
20-24	132170 (8.80)	113917 (9.12)	246087 (8.94)	139394 (8.50)	106693 (9.60)
25-29	118051 (7.86)	106048 (8.49)	224099 (8.15)	127095 (7.75)	97004 (8.73)
30-39	184737 (12.30)	155512 (12.45)	340249 (12.37)	186461 (11.37)	153758 (13.84)
40-49	135023 (8.99)	103925 (8.32)	238948 (8.69)	135295 (8.25)	103653 (9.53)
50-59	91167 (6.07)	70574 (5.65)	161741 (5.88)	99708 (6.08)	62033 (5.58)
60& Above	87863 (5.85)	67076 (5.37)	154939 (5.63)	102167 (6.23)	52772 (4.75)
All age	1501927 (100.00)	1249094 (100.00)	2751021 (100.00)	1639935 (100.00)	1111086 (100.00)

Note : Figures in Bracket are percentage to total population.

Source: Statistical Bulletin (1999)

When we compare the various age groups of population living in Agra district with various age groups of population residing in Uttar Pradesh as a whole, we found that 40.41 per cent of the state population was in age group of below 15 years and was similar to the population of Agra district of the same age group, which was 40.33 per cent. The population in the working age group of 15 to 59 years, was 54.04 per cent in Agra district and was found slightly higher than the state percentage of population was 52.13 per cent. As far as population in age group of 60 and above was concerned, it was

5.63 per cent in Agra district and 7.56 per cent in the state. The urban population of Agra district was 40.39 per cent while urban population in the State at the same point of time was 19.84 per cent. The rural percentage of population of the district was 59.61 per cent while state percentage was very high and it was 80.16 (Tables 2.2 & 2.3).

Table 2.3: **Population of U.P. According to Various Age Groups**

(in 000)

Age-group	Total				
	Male	Female	Total	Rural	Urban
0-4	9790 (13.22)	9264 (14.23)	19054 (13.70)	15589 (13.98)	3465 (12.55)
5-9	10604 (14.32)	9497 (14.57)	20083 (14.44)	16359 (14.67)	3724 (13.49)
10-14	9234 (12.48)	7704 (11.84)	16938 (12.17)	13457 (12.07)	3481 (12.61)
15-19	7358 (9.94)	5627 (8.65)	12985 (9.33)	10094 (9.05)	2891 (10.47)
20-24	5822 (7.86)	5538 (8.51)	11360 (8.17)	8910 (7.99)	2450 (8.88)
25-29	5253 (7.09)	4997 (7.68)	10250 (7.37)	8079 (7.24)	2171 (7.86)
30-39	8692 (11.74)	8164 (12.54)	16856 (12.12)	13202 (11.84)	3654 (13.24)
40-49	6687 (9.03)	5864 (9.02)	12551 (9.02)	10013 (8.98)	2538 (9.19)
50-59	4661 (6.29)	3854 (5.92)	8515 (6.12)	7023 (6.30)	1492 (5.40)
60 & above	5937 (8.03)	4584 (7.04)	10521 (7.56)	8781 (7.88)	1740 (6.30)
Total	74037 (100.00)	65075 (100.00)	139112 (100.00)	111506 (100.00)	27606 (100.00)

Note : Figures in Bracket show the percentage of the total  
Source: Statistical Bulletin (1999)

## II.2 **CLASSIFICATION OF POPULATION ACCORDING TO WORKERS**

According to Census 1991, the total workers in Agra district were 7,54,273, which constituted 27.42 per cent of total population in the district. This was slightly lower (2.31 per cent) than the state average (29.73 per cent). The marginal workers were only 0.71

per cent of the total population of the district while the marginal workers in the State were 2.47 per cent. Thus, total workers in Agra district were 28.13 per cent in it's population while total workers in U.P. were 32.20 per cent of the state's population (Table 2.4).

**Table 2.4: Worker-wise Break-up of Agra Population**

Item	Agra	U.P.
Total Population	2751021 (100.00)	139112000 (100.00)
Total Main Worker	754273 (27.42)	41361000 (29.73)
Total Marginal Worker	19448 (0.71)	3438000 (2.47)
Total Worker	773721 (28.12)	44799000 (32.20)

Source: Statistical Bulletin (1999)

Further, the total main workers have been categorized into ten categories. Those are – (i) Cultivators, (ii) Agricultural labourers, (iii) Industry and Mining Workers, (iv) Household Industry Workers, (v) Non-household industry workers, (vi) Construction workers, (vii) Trade and Commerce, (viii) Transport, Storage and Communication workers, (ix) Animal Husbandry and Plantation workers, and (x) Workers involved in other services. In Agra district total cultivators were 2,73,000, which was 36.19 per cent of the total main workers and was less than the state average of 53.26 per cent. The second highest category of workers in Agra district were those involved in other services who constituted 16.30 per cent of the total main workers and was higher than the state average of 9.98 per cent. Non-household industry workers were 14.04 per cent of the total main workers in the district while state average was 5.34 per cent. Thus, maximum number of workers were found in these three categories in district Agra. Other categories of workers were agricultural labourers (11.06 per cent) of total main workers, while state

main workers while state average was 6.17 per cent. The workers involved in household industry were 3.95 per cent of the total main workers of the district and state average was 2.41 per cent. It was found lower than the district average. The workers involved in transport and communication services were 3.79 per cent of total main workers of the district while state average was 1.86 per cent. The construction workers were 2.10 per cent of total main workers in the district and state average was 1.24 per cent. Workers involved in animal husbandry and plantation activities were 0.57 per cent of the total main workers while in state they were 0.72 per cent. The workers in industrial and mining sector were 0.26 per cent of the total main workers of the district while state average was 0.08 per cent (Table 2.5).

**Table 2.5 : Classification of Worker**

S.N.	Category	Agra	U.P.
1.	Cultivators	273000 (36.19)	22031000 (53.26)
2.	Agricultural Labours	83396 (11.06)	7833000 (18.94)
3.	Animal Husbandry & Plantation	4330 (0.57)	296000 (0.72)
4.	Industry & Mining	1953 (0.26)	35000 (0.08)
5.	Household industry	29752 (3.95)	997000 (2.41)
6.	Non household industry	105910 (14.04)	2208000 (5.34)
7.	Construction	15842 (2.10)	511000 (1.24)
8.	Trade & Commerce	88556 (11.74)	2551000 (6.17)
9.	Transport Storage & Communication	28590 (3.79)	771000 (1.86)
10.	Other Services	122944 (16.30)	4128000 (9.98)
	Total Main Workers	754273 (100.00)	41361000 (100.00)

**Note** : Figures in bracket indicate the percentage of total main workers.

**Source** : Compiled from statistical Bulletin (1999)

### II.3 LITERACY RATE

According to Census 1991, the literacy rates in Agra district was higher than the literacy rates in Uttar Pradesh. The total literacy rate of the district was found to be 48.6 per cent, while the total literacy rate of the state was 41.60 per cent. 63.1 per cent of the males population and 30.8 per cent of females population was literate in the district, while 55.73 per cent of the males population and 25.31 per cent of female populations was literate in the State as a whole. When we compare the literacy rates of rural and urban parts of the district with the literacy rates of rural and urban parts of the state, we found that 59.1 per cent of male population in rural part of the district was literate and was higher than the state which was 52.05 per cent. In the rural part of the district, 17.6 per cent females were literate and it was less than the state average which was 19.02 per cent. The total literacy in rural part of the district (males and females combined) was 40.7 per cent which was higher than the total literacy in rural part of the state that was 36.66 per cent. Similarly, in urban part of the district, it was 69.0 per cent for male population and 48.9 per cent for female population. In urban part of the U.P., 69.98 per cent of male population and 50.38 per cent of female population was literate. The total literacy rate in urban part of the district (including male and female) was 59.8 per cent and was lower than the total literacy rate in urban part of the state which was 61.00 per cent (Table 2.6).

Table 2.6 : Percentage of Literacy in Agra District and U.P. (1991)

Item	Agra	Uttar Pradesh
<b>Total District</b>		
Male	63.1	55.73
Female	30.8	25.31
Total	48.6	41.60
<b>Rural</b>		
Male	59.1	52.05
Female	17.6	19.02
Total	40.7	36.66
<b>Urban</b>		
Male	69.0	69.98
Female	48.9	50.38
Total	59.8	61.00

**Note:** Literacy Rate of the District is concern only with the Population 7+.

**Source:** Statistical Bulletin (1999)

### III.4 PROJECTION OF POPULAITON

Agra is one of the densely populated (683 per sq. km.) districts of Uttar Pradesh. We have projected the population of Agra district and Uttar Pradesh up to the period of 2010. For the projection of population following formula has been used:

$$\gamma = \frac{P_t - P_o}{P_o \times n} \times 100$$

Where,       $P_o$       =      Base Year  
                   $P_t$       =      Final Year  
                   $n$         =      Number of years  
                   $\gamma$         =      Growth Rate

Taking 1990-91 as a base year and 2000-2001 as the final year, the growth rate has been calculated. Growth rate for total population of Agra district was found 2.19 per cent, whereas the growth rate for total population of state was found 1.35 per cent. In Agra district, the growth rate for male population was found 2.16 per cent and for female

population it was found 2.22 per cent. On the other hand, in Uttar Pradesh, the growth rate for male population was 1.03 per cent and it was 1.66 per cent for female population. It has been observed that the population growth rate in Agra district was higher than that of state population growth rate. Considering above population growth rates, we have projected population for Agra district and U.P. State upto the year 2010. It showed an increase in population during the period 2000-2001 to 2009-2010, 19.69 per cent in Agra and 11.95 per cent in Uttar Pradesh. According to projections, the total population of district Agra would be 43,22,310 and the total population of U.P. would be 18,59,01,819 by the year 2009-2010 (Table 2.7). The impact of this increasing population on density of population, availability of land, per capita reporting area and availability of per capita net cultivated area would be adverse, while assuming that the reporting area and net cultivated area of the district and U.P. state will remain constant.

Table 2.7: Projected Population of Agra District and Uttar Pradesh (1990-91 to 2009-10)

Year	Agra			Uttar Pradesh		
	Male	Female	Total	Male	Female	Total
1990-91	1501927	1249094	2751021	74036957	65075330	139112287
2000-01	1949775	1661526	3611301	87466301	78586558	166052859
2001-02	1991890	1698412	3690302	88367204	79891095	168258299
2002-03	2034005	1735298	3769303	89268107	81195632	170463739
2003-04	2076120	1772184	3848304	90169010	82500169	172669179
2004-05	2118235	1809070	3927305	91069913	83804706	174874619
2005-06	2160350	1845956	4006306	91970816	85109243	177080059
2006-07	2202465	1882842	4085307	92871719	86413780	179285499
2007-08	2244580	1919728	4164308	93772622	87718317	181490939
2008-09	2286695	1956614	4243309	94673525	89022854	183696379
2009-10	2328810	1993500	4322310	95574428	90327391	185901819

## II.5 PER CAPITA AVAILABILITY OF LAND

Agra is one of the densely populated districts of Uttar Pradesh. Since land is a fixed commodity and population is growing with a certain pace, as a result, per capita of land availability would decrease. Along with population, we have projected Per Capita Reporting Area and per capita Net Cultivated Area for Agra District and U.P. state upto the year 2010. The per capita reporting area of Agra district was 0.145 hectare and per capita Net cultivated area was 0.104 hectare in year 1990-91. In the same year, per capita reporting area and net cultivated area of the state was higher and 0.175 hectare and 0.119 hectare respectively. According to our projections, the per capita reporting area of the Agra district was 0.110 hectare in 2000-2001 and would decrease upto 0.092 hectare in the year 2009-2010. It has been found that the net cultivated area of Agra district would also decrease from 0.080 hectare in 2000-2001 to 0.067 hectare in 2009-2010. The per capita reporting and net cultivated area of the district was low as compared to the per capita reporting and net cultivated area of the state. Hence, both the areas are showing a reducing trend in the state too (Table 2.8).

Table 2.8 : Per capita Availability of Land : Reported and Net cultivated Area

Year	Agra District				Uttar Pradesh	
	Estimated Population of Agra	Per Capita availability of land		Estimated Population of U.P.	Per Capita availability of Land	
		Reported area(Hect)	Net Cultivated area (Hect)		Reported area (Hect)	Net Cultivated area (Hect)
1990-91	2751021	0.145	0.104	139112287	0.175	0.119
2000-01	3611301	0.110	0.080	166052859	0.146	0.101
2001-02	3690302	0.108	0.078	168258299	0.144	0.100
2002-03	3769303	0.106	0.077	170463739	0.142	0.099
2003-04	3848304	0.103	0.075	172669179	0.140	0.098
2004-05	3927305	0.101	0.074	174878619	0.138	0.097
2005-06	4006306	0.099	0.072	177080059	0.137	0.096
2006-07	4085307	0.097	0.071	179285499	0.135	0.095
2007-08	4164308	0.096	0.070	181490939	0.133	0.095
2008-09	4243309	0.094	0.068	183696379	0.132	0.094
2009-10	4322310	0.092	0.067	185901819	0.130	0.093

## **II.6 LANDHOLDING WISE NUMBER OF FARMERS**

To examine the number of different land holding farmers of district Agra and to compare them with Uttar Pradesh, we have categorized the total land holding farmers of the district and state into three broad categories i.e., (i) Marginal Land Holdings farmers; (ii) Small Land Holdings farmers; and (iii) Medium and Large Land Holdings farmers. We have also projected all these landholding farmers having different land sizes upto the year 2009-2010. The marginal land holdings farmers were 132 thousand (58.93 per cent of the total farmers) in the district Agra in 1995-96. According to our projections these marginal land holdings farmers will increase upto 141.52 thousand (63.02 per cent of the total farmers) in the year 2009-2010. Small land holding farmers in Agra were 47 thousand (20.98 per cent of the total farmers) in 1995-96 and will slightly reduce to 45.04 thousand (20.06 per cent of the total farmers) in the year 2009-2010. The medium and large land holding farmers of the district would reduce from 45 thousand (20.09 per cent of the total farmers) in 1995-96 to 38 thousand (16.92 per cent of the total farmers) in the year 2009-2010.

In all the three categories of land holding farmers, situation in Agra district was similar to the State as a whole, where marginal land holdings farmers would increase, small land holding farmers would marginally decrease and medium and large land holding farmers would also decrease in due course of time. The marginal land holding farmers were 14819 thousand (73.82 per cent of the total farmers) in U.P. state in 1995-96. According to our projections these marginal land holding farmers will increase upto 15374.94 thousand (75.68 per cent of the total farmers) in the year 2009-2010. Small land holding farmers in U.P. were 3118 thousand (15.53 per cent of the total farmers) in

1995-96 and will slightly reduce to 3076.70 thousand hectares (15.15 per cent of the total land holdings) in the year 2009-2010. the medium and large land holding farmers of U.P. would reduce from 2137 thousand (10.65 per cent of the total farmers) in 1995-96 to 1862.32 thousand (9.17 per cent of the total farmers) in the year 2009-2010 (Table 2.9).

**Table 2.9: Changes in Number of Land Holdings in District Agra and Uttar Pradesh : 1985-86 to 2009-2010**

Year	Area (in thousand numbers)				U.P. (in thousand numbers)			
	Marginal	Small	Medium & large	Total	Marginal	Small	Medium & large	Total
1985-86	140 (56.00)	54 (21.60)	56 (22.40)	250 (100.00)	13782 (72.59)	2964 (15.61)	2239 (11.80)	18985 (100.00)
1990-91	128 (58.18)	47 (21.36)	45 (20.46)	220 (100.00)	14819 (73.82)	3118 (15.53)	2137 (10.65)	20074 (100.00)
1995-96	132 (58.93)	47 (20.98)	45 (20.09)	224 (100.00)	15574 (75.59)	2983 (14.48)	2046 (9.93)	20603 (100.00)
2000-01	135.40 (60.39)	46.30 (20.65)	42.5 (18.96)	224.20 (100.00)	15017.55 (74.49)	3103.25 (15.39)	2038.90 (10.12)	20159.70 (100.00)
2001-02	136.08 (60.68)	46.16 (20.58)	42.00 (18.74)	224.24 (100.00)	15057.26 (74.63)	3100.30 (15.37)	2019.28 (10.00)	20176.84 (100.00)
2002-03	136.76 (60.98)	46.02 (20.52)	41.50 (18.50)	224.28 (100.00)	15096.97 (74.76)	3097.35 (15.34)	1999.66 (9.90)	20193.58 (100.00)
2003-04	137.44 (61.27)	45.88 (20.45)	41.00 (18.28)	224.32 (100.00)	15136.68 (74.89)	3094.40 (15.31)	1980.04 (9.80)	20211.12 (100.00)
2004-05	138.12 (61.56)	45.74 (20.39)	40.50 (18.05)	224.36 (100.00)	15176.39 (75.03)	3091.45 (15.28)	1960.42 (9.69)	20228.26 (100.00)
2005-06	138.80 (61.85)	45.60 (20.33)	40.00 (17.82)	224.40 (100.00)	15216.10 (75.16)	3088.50 (15.25)	1940.80 (9.59)	20245.40 (100.00)
2006-07	139.48 (62.14)	45.46 (20.26)	39.50 (17.60)	224.44 (100.00)	15255.81 (75.29)	3085.55 (15.23)	1921.18 (9.48)	20262.54 (100.00)
2007-08	140.16 (62.44)	45.32 (20.19)	39.00 (17.37)	224.48 (101.00)	15295.52 (75.42)	3082.60 (15.20)	1901.56 (9.38)	20279.68 (100.00)
2008-09	140.84 (62.73)	45.18 (20.12)	38.50 (17.15)	224.52 (100.00)	15335.23 (75.55)	3079.65 (15.17)	1881.94 (9.27)	20296.82 (100.00)
2009-10	141.52 (63.02)	45.04 (20.06)	38.00 (16.92)	224.56 (100.00)	15374.94 (75.68)	3076.70 (15.15)	1862.32 (9.17)	20313.96 (100.00)

Note: Figures in bracket showing percentage to total.

## **II.7 AREA UNDER DIFFERENT HOLDINGS IN AGRA DISTRICT**

To examine the land holding size of district Agra and to compare it with U.P. State, we have categorized the size of land holdings as done in case of their numbers. We have projected five land holdings upto the year 2009-2010. The marginal land holdings were 19.66 per cent of the total land holdings of the district in 1995-96. According to our projections, marginal land holdings will increase upto 24.46 per cent of the total land holdings of the district in the year 2009-2010. Marginal land holdings of the State were higher (34.02 per cent of the total land holdings) in the year 1995-96 and showed an increasing trend and reached up to 42.27 per cent in the year 2009-2010.

The small land holding size in the district was 23.33 per cent of the total land holdings and was similar to State average, i.e. 23.81 per cent of the total land holdings of the State in the year 1995-96. Small land holding size of the district will increase and will reach upto 25.04 per cent of the total land holdings of the district in the year 2009-2010. In case of U.P. State, small land holding size will remain almost same in the year 2009-2010. In case of semi-medium and medium size of land holdings in both places (District Agra and U.P. State) showing a reducing trend.

In case of large land holding size of the district, it would reduce to half, from 4.04 per cent of the total land holdings in the year 1995-96 to 2.62 per cent in the year 2009-2010. Same sort of trend would also occur in the State where large land holding size was 2.61 per cent of the total land holdings in the year 1995-96 and will come down to 1.61 per cent in the year 2009-2010. The total land holding size of district Agra was 299.6 thousand hectares in the year 1995-96. According to our projections it will increase to 328.86 thousand hectares in the year 2009-2010. In the same manner, total land

holding size of the U.P. State would also increase from 17701.20 thousand hectares in 1995-96 to 18364.80 thousand hectares in the year 2009-2010 (Table 2.10).

Table 2.10: Land Area under Different Holdings in District Agra and Uttar Pradesh:  
1985-86 to 2009-10

(Thousand Hectares)

Year	Agra						Uttar Pradesh					
	Marginal	Small	Semi-Medium	Medium	Large	Total	Marginal	Small	Semi-Medium	Medium	Large	Total
1985-86	58.6 (16.77)	77.2 (22.09)	104.3 (29.84)	92.3 (26.41)	17.1 (4.89)	349.5 (100.0)	4993.3 (28.29)	4114.9 (23.32)	4313.1 (24.44)	3377.4 (19.14)	849.5 (4.81)	17648.2 (100.0)
1990-91	52.1 (17.93)	65.7 (22.62)	85.5 (29.43)	73.7 (25.37)	13.5 (4.65)	290.5 (100.0)	5653.3 (31.43)	4390.7 (24.41)	4206.7 (23.39)	3042.0 (16.91)	694.0 (3.86)	17986.7 (100.0)
1995-96	58.9 (19.66)	69.9 (23.33)	85.4 (28.84)	72.3 (24.13)	12.1 (4.04)	299.6 (100.0)	6023.4 (34.02)	4214.5 (23.81)	4101.30 (23.17)	2799.7 (15.82)	562.30 (3.18)	17701.2 (100.0)
2000-01	66.6 (21.48)	74.35 (23.98)	87.3 (28.16)	70.95 (22.88)	10.85 (3.50)	310.05 (100.0)	6644.7 (37.04)	4265.05 (23.78)	4000.80 (22.30)	2560.35 (14.27)	467.30 (2.61)	17938.2 (100.0)
2001-02	68.14 (21.83)	75.24 (24.10)	87.48 (28.03)	70.68 (22.64)	10.60 (3.40)	312.14 (100.0)	6768.96 (37.64)	4275.16 (23.77)	3980.70 (22.13)	2512.48 (13.97)	448.30 (2.49)	17985.6 (100.0)
2002-03	69.68 (22.17)	76.13 (24.23)	87.66 (27.90)	70.41 (22.41)	10.35 (3.29)	314.23 (100.0)	6893.22 (38.23)	4285.27 (23.78)	3960.60 (21.96)	2464.61 (13.67)	429.30 (2.38)	18033.0 (100.0)
2003-04	71.22 (22.52)	77.02 (24.35)	87.84 (27.77)	70.14 (22.17)	10.10 (3.19)	316.32 (100.0)	7017.48 (38.81)	4295.38 (23.76)	3940.50 (21.79)	2416.74 (13.37)	410.30 (2.27)	18080.4 (100.0)
2004-05	72.76 (22.85)	77.91 (24.47)	88.02 (27.65)	69.87 (21.94)	9.85 (3.09)	318.41 (100.0)	7141.74 (39.40)	4305.49 (23.75)	3920.40 (21.63)	2368.87 (13.06)	391.30 (2.16)	18127.8 (100.0)
2005-06	74.30 (23.18)	78.80 (24.59)	88.20 (27.52)	69.60 (21.71)	9.60 (3.00)	320.50 (100.0)	7266.0 (39.98)	4315.60 (23.74)	3900.30 (21.46)	2321.00 (12.77)	372.30 (2.05)	18175.2 (100.0)
2006-07	75.84 (23.51)	79.69 (24.70)	88.38 (27.40)	69.33 (21.49)	9.35 (2.90)	322.59 (100.0)	7390.26 (40.56)	4325.71 (23.74)	3880.20 (21.29)	2273.13 (12.47)	353.30 (1.94)	18222.6 (100.0)
2007-08	77.38 (23.83)	80.58 (24.82)	88.56 (27.28)	69.06 (21.27)	9.10 (2.80)	324.68 (100.0)	7514.52 (41.13)	4335.82 (23.73)	3860.10 (21.13)	2225.26 (12.18)	334.30 (1.83)	18270.0 (100.0)
2008-09	78.92 (24.15)	81.47 (24.93)	88.74 (27.16)	68.79 (21.05)	8.85 (2.71)	326.77 (100.0)	7638.78 (41.70)	4345.93 (23.73)	3840.00 (20.96)	2177.39 (11.89)	315.30 (1.72)	18317.4 (100.0)
2009-10	80.46 (24.46)	82.36 (25.04)	88.92 (27.04)	68.52 (20.84)	8.60 (2.62)	328.86 (100.0)	7763.04 (42.27)	4356.04 (23.72)	3819.90 (20.80)	2129.52 (11.60)	296.30 (1.61)	18364.8 (100.0)

Note : Figures in bracket indicate the percentage.

## II.8 CONCLUSION

According to census 1991, the total population of Agra district was 27,51,021, out of which 15,01,927 (54.60 per cent) were male and 12,49,049 (45.40 per cent) were female. The density of the district was 683 per sq.km. The population of working age group (15 to 59 years) was 54.04 per cent in the district. 27.42 per cent of the total population of the district belonged to main workers, whereas total workers were 28.13 per cent of the total population. 63.1 per cent of the male population and 30.8 per cent of female population in Agra was literate. The literacy rate among male and female of the district was higher than that of state literacy rate. As far as population growth rate was concerned, it has been observed that the population growth rate in Agra district was higher than that of state population growth rate. In Agra district marginal land holding farmers would increase, small land holding farmers would marginally decrease and medium and large land holding farmers would also decrease in due course of time. The per capita reporting and net cultivated area of the district was low as compared to the per capita reporting and net cultivated area of the state. The marginal and small land holdings of the district would increase in due course of time, while medium and large land holdings would decrease.

## **CHAPTER – III**

# **TRENDS AND PROJECTIONS IN LAND USE PATTERN OF AGRA DISTRICT**

### **III.1 INTRODUCTION**

Preparation of Model Land Use Plan requires a thorough analysis of land use pattern of the concerned area because it plays an important role in terms of growth perspective and environmental balance of the region. Therefore, this chapter is devoted to analyze the pattern and trends of land use in the district of Agra. The analysis is based on the data collected from Board of Revenue containing year-wise information relating to area under nine-fold classification of the district. The relevant data has also been compiled from the Bulletin of Agricultural Statistics published annually by Directorate of Agriculture, U.P. . The analysis covers the period beginning from the year 1980-81 to 2000-2001. The whole period under consideration has further been subdivided into five groups for analyzing the changes in land use trend and pattern.

### **III.2 TRENDS IN LAND USE PATTERN IN AGRA DISTRICT**

In this study, trends of land use pattern have been observed for a period of 1980-81 to 2000-2001. The forest area of district Agra was 39,550 hectares in the year 1980-81 constituting 8.30 per cent of the reporting area in the district. The forest area of the district increased upto 3,961 hectares over a period of five years, in 1995-96 but share of the reporting area was same (8.30 per cent) as it was in 1980-81, due to the increase in reporting area of the district. After the year 1985-86 onwards, it has been found that the forest area of the district Agra increased in every five successive years. It increased to 8.64

per cent in 1990-91, 9.97 per cent in 1995-96 and 11.41 per cent of reporting area during the year 2000-2001. As far as barren land of the district is concerned, it was 13170 hectares (2.76 per cent of the reporting area) in the year 1980-81 showed a reducing trend in every successive five years, upto 2000-2001, except during the years 1980-81 to 1985-86 where it increased marginally. The barren land of the district increased to 3.10 per cent of the reporting area in 1985-86 again reduced to 1.60 per cent in the year 1990-91 and 0.84 per cent in the year 2000-2001.

The land under non-agricultural uses was 35,318 hectares (7.40 per cent of the reporting area) in the year 1980-81. Since then, the land under non-agricultural uses in the district was found to be increasing. In the year 1985-86 it was 38596 hectares (8.08 per cent of the reporting area), in the year 1990-91, 34,003 hectares (8.53 per cent of the reporting area), in 1995-96, 35,505 hectares (8.79 per cent of the reporting area) and it was 37166 hectares (9.34 per cent of the reporting area of the district) during the year 2000-2001. The culturable waste land was found to be decreasing with fluctuations over the entire period. The culturable waste land in Agra district was 8431 hectares (1.77 per cent of the reporting area) in the year 1980-81, it was reduced to 6698 hectares (1.40 per cent of the reporting area) in the year 1985-86 again went upto 12,115 hectares (3.04 per cent of the reporting area) in the year 1990-91. The culturable waste land kept on reducing since 1990-91 onwards and was found 11,647 hectares (2.88 per cent of the reporting area) in the year 1995-96 and 5,483 hectares (1.38 per cent of the reporting area) in the year 2000-2001.

The permanent pasture land of the district was 1171 hectares (0.25 per cent of the reporting area of the district) in the year 1980-81, it was increased to 1263 hectares (0.26 per cent of the reporting area) in the year 1985-86 it again gone down to 1150 hectares (0.29 per cent of the reporting area) in the year 1990-91. Permanent pasture land was further reduced to 1056 hectares (0.26 per cent of the reporting area) in 1995-

96 and 919 hectares (0.23 per cent of the reporting area) in the year 2000-2001. The land area under miscellaneous trees had a reducing pattern in the district from 1980-81 to 2000-2001. The land under miscellaneous trees was 1551 hectares (0.33 per cent of the reporting area) in 1980-81, reduced to 1270 hectares (0.27 per cent of the reporting area) in the year 1985-86, slightly increased upto 1363 hectares (0.34 per cent of the reporting area) in the year 1990-91 and further reduced to 646 hectares (0.16 per cent of the reporting area) in 1995-96 and 451 hectares (0.11 per cent of the reporting area) in the year 2000-2001.

The land under current fallow and other fallow of the district Agra has shown a reducing trend during the period 1980-81 and 2000-2001. The land under current fallow was 26,472 hectares (5.55 per cent of the reporting area) in the year 1980-81, it was reduced to 16,956 hectares (3.55 per cent of the reporting area) in the year 1985-86, 14,588 hectares (3.66 per cent of the reporting area) in the year 1990-91, 13,990 hectares (3.46 per cent of the reporting area) in 1995-96 and again reduced to 10,468 hectares (2.63 per cent of the reporting area) in the year 2000-2001. The other fallow land, in district Agra, was 10,038 hectares (2.11 per cent of the reporting area) in the year 1980-81. It was increased to 12,498 hectares (2.62 per cent of the reporting area) in the year 1985-86. Other fallow land decreased to 1027 hectares (2.51 per cent of the reporting area of the district) in the year 1990-91, again decreased to 9816 hectares (2.44 per cent of the reporting area) in the year 1995-96. Finally other fallow land gone down upto 6171 hectares (1.55 per cent of the reporting area of the district) in the year 2000-2001.

The net area sown of Agra district was quite sizeable. This area was 340962 hectares, constituting 71.53 per cent of the reporting area of the district during the year 1980-81. At

second point of time the net area sown was increased to 345840 hectares (72.42 per cent of the reporting area) during the year 1985-86. The net area sown decreased to 284838 hectares (71.39 per cent of the reporting area) in the year 1990-91. The net sown area again reduced to 284701 hectares (70.50 per cent of the reporting area) in the year 1995-96. The net area sown in the year 2000-01, was 288640 hectares and was all time high with respect to the percentage of reporting area of the district and was 72.51 per cent (Table 3.1).

Table. 3.1: Trends In Land Use Pattern in Agra District

					(Hectare)
Land use category	1908-81	1985-86	1990-91	1995-96	2000-01
Reporting area	476663 (100.00)	477537 (100.00)	399016 (100.00)	403819 (100.00)	398060 (100.00)
Forest	39550 (8.30)	39616 (8.30)	34479 (8.64)	39510 (9.79)	45437 (11.41)
Barren Land	13170 (2.76)	14800 (3.10)	6393 (1.60)	6948 (1.72)	3325 (0.84)
Land Under Non-Agricultural uses	35318 (7.40)	38596 (8.08)	34003 (8.53)	35505 (8.79)	37166 (9.34)
Culturable waste	8431 (1.77)	6698 (1.40)	12115 (3.04)	11647 (2.88)	5483 (1.38)
Permanent Pasture	1171 (0.25)	1263 (0.26)	1150 (0.29)	1056 (0.26)	919 (0.23)
Miscellaneous Trees	1551 (0.33)	1270 (0.27)	1363 (0.34)	646 (0.16)	451 (0.11)
Current Fallow	26472 (5.55)	16956 (3.55)	14588 (3.66)	13990 (3.46)	10468 (2.63)
Other fallow	10038 (2.11)	12498 (2.62)	10027 (2.51)	9816 (2.44)	6171 (1.55)
Net area sown	340962 (71.53)	345840 (72.42)	284838 (71.39)	284701 (70.50)	288640 (72.51)

Note : Figures in bracket indicates the percentage to the reporting area.  
Source: Statistical Bulletin (District), 1999.

### **III.3 PERIOD-WISE SHIFT IN AREA UNDER DIFFERENT LAND USE CATEGORIES**

Period wise shift in area under different land use categories of Agra district has been examined taking into consideration four points of time, i.e.; 1980-81 to 1985-86, 1985-86 to 1990-91, 1990-91 to 1995-96 and 1995-96 2000-01. It has been found that the reporting area of the Agra district was changing in each duration. Initially, the reporting area of the district in 1980-81 was 476663 hectares, and in 1985-86 it was 477537 hectares. The reporting area of the district has increased by 874 hectares during the years 1980-81 to 1985-86. During the second point of time, 1985-86 to 1990-91, this area decreased by 6.44 per cent. At third point of time 1990-91 to 1995-96 the reporting area increased by 4803 hectares (1.19 per cent) and finally during fourth point of time 1995-96 to 2000-2001 it decreased by 5759 hectares (1.43 per cent).

The forest area of Agra district has increased to 66 hectares (0.17 per cent) during the period 1980-81 to 1985-86 but 5137 hectares were (12.97 per cent) reduced in between the years 1985-86 and 1990-91. During the period 1990-91 to 1995-96, the forest area of the district increased by 5031 hectares (14.59 per cent) and during 1995-96 to 2000-2001 forest area increased to 5927 hectares (15.00 per cent). The barren land of the district was increased by 1630 hectares (12.38 per cent) during the period 1980-81 to 1985-86. 8407 hectares of barren land area (56.80 per cent) reduced during the period 1985-86 to 1990-91 and 555 hectares (8.68 per cent) were increased during the period 1990-91 to 1995-96. During the period 1995-96 to 2000-2001, the barren land of the district reduced by 3623 hectares (52.14 per cent) in the district Agra.

The land under non-agricultural uses in Agra district is showing an increasing trend except during the period 1985-86 to 1990-91, where 4593 hectares (11.90 per cent) of the land under non-agricultural uses were decreased. Area of 3278 hectares under this category (9.28 per cent) increased during the period 1980-81 to 1985-86 and 1502 hectares (4.42 per cent) during the period 1990-91 to 1995-96. The land under non-agricultural uses again increased around 4.68 per cent constituting 1661 hectares during the period 1995-96 to 2000-2001. The area of culturable waste in the district is showing a shrinking trend. Culturable waste land was reduced by 20.56 per cent (1733 hectares) during the period 1980-81 to 1985-86 but increased by 80.87 per cent (5417 hectares) during the period 1985-86 to 1990-91. Again culturable wasteland started decreasing and a fall of 468 hectares in area (3.86 per cent) was observed during the period 1990-91 to 1995-96. It has been found that a big amount of culturable waste area was reduced during the period 1995-96 to 2000-2001 which was 6164 hectares (52.42 per cent).

Permanent pasture area of Agra district is reducing except during the period 1980-81 to 1985-86, where 92 hectares (7.86 per cent) increased. 113 hectares (8.95 per cent) of permanent pasture area of the district was reduced during the period 1985-86 to 1990-91. 94 hectares (8.17 per cent) were reduced during 1990-91 to 1995-96 137 hectares, (12.97 per cent) area of permanent pasture again reduced during the period 1995-96 to 2000-01. As far as current fallow and other fallow areas of the district are concerned, a reducing trend was observed throughout the period. The 7716 hectares (35.95 per cent) of area under current fallow reduced during the

period 1980-81 to 1985-86. 2368 hectares (13.97 per cent) of current fallow reduced during 1985-86 to 1990-91. 598 hectares (4.10 per cent) current fallow reduced during 1990-91 to 1995-96. Again 3522 hectares of current fallow area, which was a reduction of 25.18 per cent, reduced during the period 1995-96 to 2000-01. Area under other fallow land of the district increased by 2460 (24.51 per cent) during the period 1980-81 to 1985-86. During 1985-86 to 1990-91 this area reduced by 19.77 per cent, during 1990-91. This area reduced by 2.10 per cent and during 1995-96 to 2000-2001, the land area of other fallow reduced by 37.13 per cent, constituting 3645 hectares.

The area under miscellaneous trees decreased by 18.12 per cent (281 hectares) during the period 1980-81 to 1995-96. This area increased by 7.32 per cent (93 hectares) during the period 1985-86 to 1990-91. The area under miscellaneous trees once again decreased by 52.60 per cent (717 hectares) during the years 1990-91 to 1995-96 and again decreased by 30.19 per cent (195 hectares) during the period 1995-96 to 2000-2001.

The net area sown of Agra district increased by 1.41 per cent (4878 hectares) during the years 1980-81 to 1985-86. This area of the district decreased by 21.42 per cent (61002 hectares) during the period 1985-86 to 1990-91. A nominal reduction of 0.05 per cent (137 hectares) in net area sown of the district was observed during the period 1990-91 to 1995-96. Net area sown of the district increased by 1.36 per cent (3939 hectares) during the period 1995-96 to 2000-2001 (Table 3.2).

Table 3.2 : Period wise shift in area under different Land use Categories in district Agra  
1980-81 to 2000-01

		(Hect)			
	Land Use Category	1985-86 Over 1980-81	1990-91 Over 1985-86	1995-96 Over 190-91	2000-01 Over 1995-96
1.	Reporting area	874 (0.18)	-78521 (-16.44)	4803 (1.20)	-5759 (-1.43)
2.	Forest	66 (0.17)	-5137 (-12.97)	5031 (14.59)	5927 (15.00)
3.	Barren land	1630 (12.38)	-8407 (-56.80)	555 (8.68)	-3623 (-52.14)
4.	Land Under non- agricultural uses	3278 (9.28)	-4593 (-11.90)	1502 (4.42)	1661 (4.68)
5.	Cultivable Waste	-1733 (-20.56)	5417 (80.87)	-468 (-3.86)	-6164 (-52.42)
6.	Permanent pasture	92 (7.86)	-113 (-8.95)	-94 (-8.17)	-137 (-12.97)
7.	Miscellaneous trees	-281 (-18.12)	93 (7.32)	-717 (-52.60)	195 (-30.19)
8.	Current fallow	-9516 (-35.95)	-2368 (-13.97)	-598 (-4.10)	-3522 (-25.18)
9.	Other fallow	2460 (24.51)	-2471 (-19.77)	-211 (-2.10)	-3645 (-37.13)
10.	Net area sown	4878 (1.43)	-61002 (-17.64)	-137 (-0.05)	3939 (1.38)

Source: District Statistical Bulletin, 1999.

### III.4 GROWTH OF AREA UNDER EACH LAND CATEGORIES

The growth in area under different land use categories for Agra district are presented in Table 3.3. A negative growth rate of 1.63 per cent and 0.02 per cent has been found for reporting area of the district, during the period 1980-81 to 1990-91 and 1990-91 to 2000-01 respectively. Overall growth rate of reporting area of the district for a period of twenty years, i.e. 1980-81 to 2000-2001 was found positive and was 0.82 per cent. The growth rate of forest area of the district was negative during first point of time, i.e. 1980-81 to 1990-91 but it was positive during the years 1990-91 to 2000-01

(3.18 per cent). Overall, growth rate of forest area during twenty years, 1980-81 to 2000-01, was positive 0.74 per cent. The barren land of the district is found reducing with a rate 5.15 per cent during the years 1980-81 to 1990-91 and 4.80 per cent during 1990-91 to 2000-01. The overall decrease of barren land during twenty years 1980-81 to 2000-01 at a rate of 3.74 per cent. Culturable waste of the district increased at a rate of 4.37 per cent during the years 1980-81 to 1990-91 and was decreasing at a rate of 5.47 per cent during 1990-91 to 200-01. During the period of twenty years 1980-81 to 2000-01, culturable wasteland of the district decreased at a rate of 1.75 per cent. The land under non-agricultural uses reduced at a rate of 0.37 per cent during the period 1980-81 to 1990-91. During the years 1990-91 to 2000-2001 this area increased at a rate of 0.93 per cent. The land under non-agricultural uses of the district increased at a rate of 0.26 per cent during the years 1980-81 to 2000-01.

Area under permanent pasture in the district was reducing at a rate of 0.18 per cent during the years 1980-81 to 1990-91. It reduced during the years 1990-91 to 2000-2001 at a rate of 2.01 per cent. Over a period of twenty years, 1980-81 to 2000-01 permanent pasture reduced at a rate of 1.08 per cent. The area under miscellaneous trees of the district reduced at a rate of 1.21 per cent during the years 1980-81 to 1990-91 and reduced at a rate of 6.69 per cent during 1990-91 to 2000-01. Over the period of twenty years, i.e. 1980-81 to 2000-01 the area under miscellaneous trees reduced at a rate of 3.55 per cent. The area under current fallow of the district was reducing at a rate of 4.49 per cent during the years 1980-81 to 1990-91, 2.82 per cent during the years 1990-91 to 2000-01 and overall for a period of twenty years, i.e. 1980-81 to 2000-01 it reduced at a rate of 3.02 per cent. The area under other fallow also reduced during the period of twenty years, i.e. 1980-81 to 2000-01. It reduced at a rate of 0.01 per cent

during 1980-81 to 1990-91, 3.85 per cent during 1990-91 to 2000-01. The reduction rate was 1.93 per cent during the twenty years of the period, i.e. 1980-81 to 2000-01. The net area sown was found reducing at a rate of 1.65 per cent during 1980-81 to 1990-91 but it increased during the period 1990-91 to 2000-01 at a rate of 0.13 per cent. The overall net area sown of the district during twenty years of time, 1980-81 to 2000-01, showed a decreasing trend at a rate of 0.77 per cent (Table 3.3).

Table- 3.3: Growth rate in area under different land use Categories in Agra district

Sl. No.	Land use Category	1980-81 to 1990-91	1990-91 to 2000-01	1980-81 to 2000-01
1.	Reporting area	-1.63	-0.02	-0.82
2.	Forest	-1.28	3.18	0.74
3.	Barren Land	-5.15	-4.80	-3.74
4.	Land Under Non-Agricultural	-0.37	0.93	0.26
5.	Cultivable Waste	4.37	-5.47	-1.75
6.	Permanent Pasture Fallow	-0.18	-2.01	-1.08
7.	Miscellaneous	-1.21	-6.69	-3.55
8.	Current Fallow	-4.49	-2.82	-3.02
9.	Other	-0.01	-3.85	-1.93
10.	Net are sown	-1.65	0.13	-0.77

Source: District Statistical Bulletin, 1999.

### **III.5 PROJECTIONS OF AREA UNDER DIFFERENT LAND USE CLASSES**

Projections for the area under different land use classes were computed by us from the year 2000-01 to 2009-10, considering that the reporting area, which was 398060 hectares in the year 2000-01 would remain constant. It has been found that the forest area of the district would increase from 45437 hectares in 2000-01 to 58272

hectares in the year 2009-2010. The forest area of the district was 11.41 per cent of the reporting area of the district in the year 2000-01 and would be 14.64 per cent of the reporting area in the year 2009-2010. The barren land of the district would reduce from 0.84 per cent of the reporting area in 2000-01 to 0.29 per cent of the reporting area in the year 2009-2010. The land area under non-agricultural uses was 9.34 per cent of the reporting area of the district in 2000-01 which would increase to 9.90 per cent of the reporting area in the year 2009-2010. Culturable waste land of the district would reduce from 1.38 per cent of the reporting area in 2000-2001 to 0.07 per cent in the year 2009-2010.

Permanent pasture area of the district was 0.23 per cent of the reporting area in the year 2000-2001 and would reduce to 0.20 per cent of the reporting area in the year 2009-2010. The area under miscellaneous trees was 451 hectares, that is, 0.11 per cent of the reporting area of the district in the year 2000-2001 which is reducing every year and would be 153 hectares in the year 2009-2010. The area of current fallow was 2.63 per cent of the reporting area (10468 hectares) in the year 2000-01. The area of other fallow land of the district would also reduce from 6171 hectares in 2000-2001 to 2111 hectares in the year 2009-2010. The net sown area of the district would almost remain same as it was 288640 hectares (72.51 per cent of the reporting area of the district) in the year 2000-01 and would be 289680 hectares (72.77 per cent of the reporting area of the district) in the year 2009-2010 (Table 3.4).

Table- 3.4: Projected Area Under different land Use Classes

Sl. No.	Land use Categories	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1.	Reporting (Ha.)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)
2.	Forest (Ha.)	45437 (11.41)	47592 (11.96)	49406 (12.42)	50925 (12.79)	52403 (13.15)	53792 (13.51)	55370 (13.91)	56633 (14.24)	57460 (14.44)	58272 (14.64)
3.	Barren Land (Ha.)	3325 (0.84)	3022 (0.76)	2743 (0.69)	2488 (0.63)	2253 (0.57)	2018 (0.51)	1807 (0.45)	1569 (0.39)	1354 (0.34)	1163 (0.29)
4.	Land Under Non-Agricultural use (Ha.)	37166 (9.34)	37486 (9.42)	37808 (9.50)	38126 (9.58)	38214 (9.60)	38444 (9.66)	38652 (9.71)	38765 (9.75)	39086 (9.82)	39410 (9.90)
5.	Culturable waste (Ha.)	5483 (1.38)	4321 (1.09)	3402 (0.85)	2667 (0.67)	2201 (0.55)	1673 (0.42)	939 (0.24)	611 (0.15)	472 (0.12)	276 (0.07)
6.	Permanent Pasture (Ha.)	919 (0.23)	904 (0.23)	889 (0.22)	874 (0.22)	859 (0.22)	844 (0.21)	829 (0.21)	814 (0.20)	799 (0.20)	785 (0.20)
7.	Miscellaneous Trees (Ha.)	451 (0.11)	410 (0.10)	373 (0.09)	339 (0.09)	302 (0.08)	267 (0.07)	235 (0.06)	203 (0.05)	174 (0.04)	153 (0.04)
8.	Current fallow (Ha.)	10468 (2.63)	9943 (2.50)	9442 (2.37)	8963 (2.25)	8484 (2.13)	8009 (2.01)	7552 (1.89)	7098 (1.78)	6647 (1.67)	6210 (1.56)
9.	Other fallow (Ha.)	6171 (1.55)	5627 (1.40)	5128 (1.29)	4663 (1.17)	4244 (1.07)	3798 (0.95)	3345 (0.84)	2920 (0.73)	2505 (0.63)	2111 (0.53)
10.	Net area sown (Ha.)	288640 (72.51)	288755 (72.54)	288869 (72.57)	288985 (72.60)	289100 (72.63)	289215 (72.66)	289331 (72.69)	289447 (72.71)	289563 (72.74)	289680 (72.77)

### III.6 CONCLUSION

It has been found that the maximum land of Agra district was under net area sown during the year 2000-2001. The net area sown of the district was 288640 hectares (72.51 per cent of the reporting area of the district), while land under miscellaneous trees was having a minimum area of 451 hectares (0.11 per cent of reporting area of the district) during the same year. The area under forest was 45437 hectares (11.41 per cent of the reporting area of the district) in 2000-01. The growth rate over a period of 20

years (1980-81 to 2000-01) was found negative in all land categories except in forest land (0.74 per cent) and land under non-agricultural uses (0.26 per cent) having positive growth. Projection of area under different land use classes upto the year 2009-2010, shows that the forest area, land under non-agricultural uses and net area sown of the district would increase while barren land, culturable waste, permanent pasture, area under miscellaneous trees, current fallow and other fallow of the district would decrease.

## **CHAPTER IV**

### **IDENTIFICATION OF AREAS FOR LAND USE PLANNING IN AGRA DISTRICT**

The utilization of land for varying purposes hardly follows a standard pattern. It is generally governed by the human needs. It becomes difficult to achieve a balance unless land use plan is not prepared with proper identification of areas which require intervention. In this chapter, each of the nine classification of land uses has been scrutinized in order to identify those uses of land which need planning in Agra district.

#### **IV.1 LAND UNDER FOREST**

The forest cover in Uttar Pradesh was drastically reduced after carving out of the State of Uttaranchal. Even before formulation of Uttaranchal, land used for forest was far lower than the standard norm in most of the plain districts of State. In Agra district, land area under forest has been quite lower in comparison with the norm of 30 per cent share of forest area in reporting area as recommended by National Forest Policy. Keeping in view the progress of State Forest Department in increasing the forest area in different districts of State including the Agra district, it did not seem possible that forest area would increase to the level of 30 per cent in the reporting area of the district during coming ten years or so. However, there is need to divert land from other uses for afforestation to increase the forest cover in the district and it requires a proper planning.

## **IV.2 BARREN LAND**

In Agra district, area of barren land constitute around 1 per cent of reporting area in the year 2000-2001. Certainly, such a large area of barren land, requires a plan to utilize it in the near future. According to the officials of Department of Agriculture, around 35 per cent of total barren land in the district is rocky and hence not usable with the given level of technology of barren land reclamation. For the reclamation and use of rest of the area of barren land, Department of Agriculture and World Bank aided Sodic Land Reclamation Project have been engaged. Keeping in view their past performance, it is to be decided that how much area of the barren land can be treated for different uses.

## **IV.3 LAND UNDER NON-AGRICULTURAL USES**

The land used for non-agricultural purposes is increasing due to urbanisation and industrialisation. It is one of the important symbols of development in the present time. In Agra district, more than 9 per cent of the reporting area is under non-agricultural uses at present and it is likely to increase during coming years. Therefore, demand of land for non-agricultural purposes is to be met from other categories of land. It is evident from the observation that generally agricultural land has been diverted for non-agricultural uses. In this situation, rate of growth in the area of non-agricultural uses is to be planned. It is also to be looked into the possibility of using of non-agricultural areas for other purposes.

## **IV.4 CULTURABLE WASTE**

The area of culturable waste constitutes 1.38 per cent in the year 2000-2001 of the reporting area in Agra district. Culturable waste is the land which can be reclaimed for agricultural purposes. Keeping in view the growth in demand of land for varying

purposes, area of culturable waste can be utilised for cultivation, for increasing forest cover and for non-agricultural purposes. Therefore, culturable waste land requires proper planning for its possible use during the coming years.

#### **IV.5 PERMANENT PASTURE LAND**

The area of pasture land is around 0.25 per cent in the reporting area of Agra district. During the last years, there has been some decline in this area. But keeping in view the population of livestock in the district, further reduction in the area of pastures would become undesirable. Therefore, in the proposed Model Land Use Plan of Agra district, area of pasture land would not be touched for any other uses. It will be proposed to remain the same during each year upto 2009-2010 to the level of 2000-2001.

#### **IV.6 AREA UNDER MISCELLANEOUS TREES**

There has been considerable decline in the area under miscellaneous trees during past years in the district. The continuous reduction in area under miscellaneous trees also acted as pull factor for increasing forest area of the district. Actually the area under miscellaneous trees constituted the area of old orchards, new orchards and scattered trees. On the whole, cutting of trees also has adverse environmental impact. Thus, from both view points, i.e. afforestation and environment, it is proposed that upto 2009-2010, further decline in the area of miscellaneous trees would be checked and it will be maintained at the existing level.

#### **IV.7 FALLOW LAND**

The area of both type of fallow land is substantial in the district. In particular, area under current fallow has been around 3.00 per cent of the reporting area in 2000-

2001. The other fallow land also constituted 1.55 per cent in reporting area. In the proposed land use plan, a framework for the management of fallow land would be devised so that fallow land could be diverted for cultivation and other uses.

#### **IV.8 NET AREA SOWN**

The net area sown in Agra district is sufficient for agricultural purposes. The area has risen over the years in the district. The land under the net area sown is 288640 hectares (72.51 per cent of the total reporting area of the district) in the year 2000-2001. There is a need that some area of net sown should be shifted to the forest cover area, taking under consideration of pollution and environment of the district. It is, therefore, required that a plan be proposed incorporating a nominal and required level of land to be shifted to other land use categories during coming ten years in the district of Agra.

On the basis of above, following seven (7) categories of land uses in the district require planning for their proper utilization upto the year 2009-2010:

- (i) Planning for Forest Area.
- (ii) Planning for Barren Land.
- (iii) Planning for Land under Non-Agricultural Uses.
- (iv) Planning for Culturable Waste.
- (v) Planning for Current Fallow.
- (vi) Planning for Other or Old Fallow.
- (vii) Planning for Net Area Sown.

## **CHAPTER – V**

### **LAND USE PLANNING OF AGRA DISTRICT**

In the preceding chapter, trends in land use pattern of Agra district from 1980-81 to 2000-2001 has been examined. The analysis revealed the status of land use pattern during the period. It has been found that utilization of land for various purposes was not proper and was in haphazard way. Therefore, it is required that a proper plan for the use of land for various needs, is to be prepared for the district. The proposed plan should be realistic, not utopian one and could be implemented in the future. Considering all these points, a model land use plan for different land uses has been presented here.

#### **V.1 STATUS OF FOREST**

The forest cover in Agra district was 8.30 per cent (39550 hectares) of the reporting area of the district during the year 1980-1981. Forest area of the district remains same upto the year 1985-86. Since then it is showing an increasing trend in the district. Forest area increased to 8.64 per cent of the reporting area of the district in 1990-91. It increased to 9.79 per cent of the reporting area in 1995-96 and again increased in the year 2000-2001 and reached all time high of 11.41 per cent (45437 hectares). At present forest area is found far below than the standard norms of 30 per cent, recommended in the National Forest Policy. Though, it would be impractical to think of increasing the forest area to the level of 30 per cent during the coming ten years or so but serious efforts are now required to increase the forest area, keeping in view the implications of finance and administrative task. One more point is to be taken note here is that the future planning of increasing forest area will not mean increasing the area

reserved for forest alone but the emphasis will be to increase tree cover rather than forest cover only.

## **V.2 PLAN OF INCREASING FOREST COVER**

As above mentioned that the forest area of district Agra is increasing since 1990-1991 onwards. Therefore, it is a good sign for the district but forest area is still below than the standard norms of forest policy and requires increase. Now the question arises that how much area of other land uses can be utilized for tree cover in successive years, which must be realistic one. On the basis of discussion with the officials of the Department of Forest, Government of Uttar Pradesh, following methodology to increase tree cover in Agra district is proposed.

## **V.3 METHODOLOGY**

The net area sown is the most suitable for plantation of trees. But plantation on large scale on the sown area would be impractical. Therefore, it is to be decided that during each year, how much area of the net sown area could be covered with the trees. Moreover, there are different types of land owners who own land of different sizes. In this situation a uniform area can not be fixed for increase in tree cover. As shown in Table 5.1, net area sown of Agra district was classified in different five categories and it is proposed to cover different proportion of area under each class from less than one hectare to 10 hectares and above. On an average, 0.50 per cent of net area sown of Agra district is proposed to be covered with trees each year from 2001-2002 to 2009-2010.

Table 5.1 : Plan to Increase Tree Cover on Net Sown Area in Agra District

Land Size Group	Percentage of Area Proposed for Tree Cover
Less than One Ha.	0.08
1 – 2 Ha.	0.39
2 – 4 Ha.	0.58
4 – 10 Ha.	0.78
10 Ha. and above	0.97
Total	0.50

The other land use category is Barren land on which plantation would be taken up to increase tree cover in the district. The Directorate of Agriculture and Bhoomi Sudhar Nigam are involved in the reclamation of barren land that included the sodic land as well. After having a discussion with the officials of both the departments, it was revealed that in the category of barren land, around 35 per cent land is completely useless and can not be put to any other use. Thus, 35 per cent land falling in this category is to be left and remaining 65 per cent of the barren land is to be used for various needs. It has been decided to undertake plantation on 2 per cent of barren land each year from 2001-2002 to 2009-2010. Land under non-agricultural uses has emerged as of the important use of land, because of urbanization and industrialisation. As per estimation of the department of Forest, it could be practical to bring 0.50 per cent of the area of non-agricultural uses under tree cover during every year.

Culturable waste is such type of land which though not under cultivation but is worth of cultivation. The Department of Forest has planned to use 6.25 per cent of total culturable waste each year for increasing tree cover. This is found to be on higher side.

In case of Agra district, it is planned to use 1.50 per cent of culturable waste to increase tree cover.

The area under pasture land is lowest among all other land use categories and showing a constant figure over the years in a fluctuating manner. So keeping in mind, the livestock population of the district, it would not be feasible to extend tree cover on the permanent pasture land. The area under miscellaneous trees and groves is also found to be decreasing since 1980-1981 to 2000-2001 in a fluctuating manner. Therefore, area of miscellaneous trees is likely to continue declining during the years to come. In this situation, whatever area of miscellaneous trees could be left, that will be treated as part of the forest area.

The fallow land comprised of two types. One is the current fallow which is left uncultivated during the current agricultural season. Another is old fallow or other fallow, which remains uncultivated for more than one year. While planning for increasing tree cover on such types of fallow land, Department of Forest hopes to utilize much higher percentage of both types of fallow land each year. But it is proposed to increase tree cover in Agra district by bringing 0.50 per cent from current fallow and 1.00 per cent from other fallow land each year.

On the basis of methodology outlined above, the area of different uses of land on which tree cover has been proposed to be extended is shown in Table 5.2.

Table 5.2: Area of Different Land Uses which is to be used for Tree Cover in Agra District Upto 2009-2010

(in Hect.)

Year	Net Sown Area	Barren Land	Land under Non-Agricultural Uses	Culturable Waste	Current Fallow	Other Fallow	Existing Forest Area	Total Area Proposed for Tree Cover (2 to 8)	Percentage of Reporting Area
1	2	3	4	5	6	7	8	9	10
2000-01	--	--	--	--	--	--	45437	--	11.41
2001-02	1443	43	186	82	52	62	45437	47305	11.89
2002-03	1436	42	193	77	48	57	47305	49158	12.35
2003-04	1429	40	199	72	44	52	49158	50994	12.81
2004-05	1420	38	206	67	41	47	50994	52813	13.27
2005-06	1411	37	213	63	38	43	52813	54618	13.72
2006-07	1401	35	220	59	35	39	54618	56407	14.17
2007-08	1391	34	228	55	32	35	56407	58182	14.62
2008-09	1380	33	236	52	29	33	58182	59945	15.06
2009-10	1369	31	244	48	27	30	59945	61694	15.50

On the basis of above estimates there would be an additional forest cover by 0.49 per cent of the existing forest area in the year 2001-2002. But as the time proceed, percentage of additional tree cover area to the existing forest area would nominally decline. However, the percentage of forest area of our proposed plan of forest development will increase the share of forest area in total reporting area of the district by 11.88 per cent in the year 2001-2002 as shown in Table 5.2. By the end of 2009-2010, percentage of forest area in reporting area will increase and will reach to 15.50 per cent of the reporting area of the district. Therefore, during the period 2001-2002 to 2009-2010, share of forest area in reporting area of the district would be around 15.50 per cent. Any planning to increase the forest area beyond what has been planned here in

case of Agra district, would not be practically possible as substantial financial implications are involved.

An estimation of funds that would be required to increase the proposed forest cover with the assumption that the proposed increase in forest cover would be achieved through people's participation not through involving departmental forestation. The non-departmental expenditure will cost only the supply of seedling @ 1100 seedlings per hectare, costing Rs.5.00 per seedling. The seedlings may be grown privately and the farmers may be subsidized in the purchase of these seedlings. If it is assumed that 1100 seedlings per hectare at the rate of Rs.5.00 per seedling would be needed, the estimated financial requirement would be around Rs.97 lakh to one crore per year as becomes evident from the following estimations (Table 5.3).

Table 5.3 : **Estimated Financial Requirement for the Proposed Area in Tree Cover of Agra District from 2001-02 to 2009-2010**

Year	Total Area (Ha.)	Total Seedling Required (No.)	Rate of Seedlings (Rs.)	Total Cost (Rs.)
2001-02	1868	2054800	5.00	10274000
2002-03	1853	2038300	5.00	10191500
2003-04	1836	2019600	5.00	10098000
2004-05	1819	2000900	5.00	10004500
2005-06	1805	1985500	5.00	9927500
2006-07	1789	1967900	5.00	9839500
2007-08	1775	1952500	5.00	9762500
2008-09	1763	1939300	5.00	9696500
2009-10	1749	1923900	5.00	9619500

#### **V.4 PLAN OF BARREN LAND USE**

Barren land is composed of two types. One is the barren land which can not be utilized either for cultivation or to grow any type of vegetation on it. The other form of

barren land which is called the area under usar and non-cultivable land. In this category of barren land, there seems to be its two parts. One is the usar land which can be reclaimed and put under cultivation and other is the land which is absolutely worthless for any use.

In the plan of increasing forest cover in the district, 2 per cent of barren land during each year from 2001-2002 to 2009-2010 has been earmarked for afforestation to increase the tree cover. Therefore, from the barren land in each year, part of the barren land on which forestation has been proposed would be subtracted. The remaining would be the area of barren land that would be workable for the planning. As mentioned above, officials of the Agriculture Department hold the view that 35 per cent to 40 per cent of the existing barren land is not worth for any use. Following their notion, 35 per cent of the area of the existing barren land would be subtracted from the total barren land area which can not be reclaimed. Thus, 65 per cent of barren land during each year becomes available for reclamation. However, the entire 65 per cent area of the reclaimable barren land can not be treated at one point of time. In the State, Department of Agriculture and Bhoomi Sudhar Nigam have been engaged in the treatment of barren land. The efforts put in, by both the departments in this direction, resulted in the reduction of barren land by merely 1.0 per cent per year during the period of 1995-96 to 2000-2001. Since financial implications of barren land reclamation is substantial and given the financial allotments to these departments by the government in the past, it is assumed that both the departments would be able to treat around 2 per cent of the barren land per year during the period of 2001-2002. In the same way, it is assumed here that the reclaimable area of barren land in Agra district would decline by 2 per cent per year during the period of 2001-2002 to 2009-2010. On an average, 36.34 hectares area of barren land would be reclaimed per year in Agra district during 2001-2002 to 2009-2010.

In Table 5.4 plan of barren land use in case of Agra district for the period 2001-2002 to 2009-2010 has been prepared and depicted.

Table 5.4 : **Proposed Plan of Barren Land Use in Agra District**

(in Ha.)

Year	Barren Land	Rocky and Ravenous (35% of Barren Land)	Reclaimable Barren Land	Barren Land Diverted for Tree Cover	Barren Land Available for Reclamation	Proposed for Reclamation	Remaining Barren Land	Net Barren Land Available (3+8)	Percentage of Barren Land in Reporting Area
1	2	3	4	5	6	7	8	9	10
2000-01	3325								0.84
2001-02		1164	2161	43	2118	42	2076	3240	0.81
2002-03		1164	2076	42	2038	41	1993	3157	0.79
2003-04		1164	1993	40	1953	39	1914	3078	0.77
2004-05		1164	1914	38	1876	38	1838	3002	0.75
2005-06		1164	1838	37	1801	36	1765	2929	0.74
2006-07		1164	1765	35	1730	35	1695	2859	0.72
2007-08		1164	1695	34	1661	33	1628	2792	0.70
2008-09		1164	1628	33	1595	32	1563	2727	0.68
2009-10		1164	1563	31	1532	31	1501	2665	0.67

It is evident from the above Table 5.4 that the area of barren land was 3325 hectares in the year 2000-2001. Out of this area, 35 per cent has been assumed to be rocky and ravinous. Such area comes to 1164 hectares in the year 2001-2002. The net reclaimable barren land in the year 2001-2002 was 2161 hectares, out of which 2 per cent (43 hectares) would be available for reclamation in the same year in the district. As proposed in our methodology, 1.99 per cent of this available barren land would be reclaimed every year upto 2009-2010. The reclaimed barren land would be 42 hectares in the year 2001-2002, 41 hectares in 2002-2003, 39 hectares in 2003-2004, 38 hectares in 2004-2005, 36 hectares in 2005-2006, 35 hectares in 2006-2007, 33 hectares in 2007-2008, 32 hectares in 2008-2009 and 31 hectares in 2009-2010. The barren land available

for reclamation, i.e. 2118 hectares in the year 2001-2002 would be reduced to 1501 hectares in the year 2009-2010.

## **V.5 PLAN OF LAND AREA UNDER NON-AGRICULTURAL USES**

Land area used for various non-agricultural purposes constitutes more than 9 per cent of the reporting area of the district by the year 2000-2001. If the growth in the area under non-agricultural uses is examined, it showed a negative growth of around 12 per cent during 1985-1986 to 190-1901. During the period of 1995-96 to 2000-2001, area under non-agricultural uses increased by around 5 per cent. Thus, on the basis of land use data published by the Directorate of Agriculture, it can be inferred that the area under non-agricultural uses does not indicate any definite trend rather its share in reporting area of the district hovered around 9 per cent since long period of time. According to the Master Plan of Agra, 2001, prepared by the Town and Country Planning, Department of Uttar Pradesh, land used for non-agricultural purposes in urban areas of the Agra district experienced a growth of 58.07 per cent during 1985-2000. On this basis, land put to non-agricultural uses in urban areas of the district had an annual growth of 3.89 per cent per annum during the last 15 years. It is the fact that constituents of the land used for various non-agricultural purposes in rural and urban areas are the housing, commercial and trade, offices, education centres, industries, recreation, park and play-ground facilities, utility, transport, river and open spaces. Taking into account the growth of population in the district and past growth in the area used for various non-agricultural purposes in urban areas of the district, it has been assumed that land area put to various non-agricultural uses would have a positive annual growth of 4 per cent each year upto 2009-2010. It is to be now considered that which of the uses of land would be diverted to meet the 4 per cent growth in area of non-

agricultural uses each year upto 2009-2010. It has been assumed at this point that current fallow, other fallow and net area sown are the three components of land, from which land would be diverted to meet the growth of 4 per cent for non-agricultural purposes. The areas of current fallow, other fallow and net area sown are proposed to be diverted to non-agricultural uses as per their proportionate shares in the land use pattern of the district.

On the above basis, area put to use of various non-agricultural purposes which was 37166 hectares in the year 2000-2001 would increase to 50564 hectares during the year 2009-2010, indicating a growth of 36.05 per cent during this period. Its share in the reporting area would also increase from 9.34 per cent in 2000-2001 to 12.70 per cent upto the year 2009-2010. The year-wise increase in the area under non-agricultural uses of Agra district from the year 2000-2001 to 2009-2010 has been presented in Table 5.5.

Table 5.5: **Proposed Plan of Increase in the Area of Non-Agricultural Uses in Agra District**

(in Hect.)

Year	Area Under Non-Agricultural Uses	Area of Non-Agricultural Uses Diverted for Tree Cover	Net Area Under Non-Agricultural Uses (2-3)	Net Area Sown to be Used for Non-Agricultural Uses	Area of Current Fallow to be used for Non-Agricultural Uses	Area of Other Fallow to be used for Non-Agricultural Uses	Total Area to be used for Non-Agricultural Uses (4 to 7)	% of Reporting Area
1	2	3	4	5	6	7	8	9
2000-01	37166	--	--	--	--	--	--	9.34
2001-02	37166	186	36980	51	30	1398	38459	9.66
2002-03	38459	193	38266	52	31	1448	39797	10.00
2003-04	39797	199	39598	54	32	1498	41182	10.35
2004-05	41182	206	40976	56	33	1550	42615	10.71
2005-06	42615	213	42402	58	34	1604	44098	11.08
2006-07	44098	220	43878	60	35	1659	45632	11.46
2007-08	45632	228	45404	62	37	1717	47220	11.86
2008-09	47220	236	46984	64	38	1777	48863	12.28
2009-10	48863	244	48619	67	39	1839	50564	12.70

## **V.6 PLAN FOR CULTURABLE WASTE**

There was large area of culturable waste in Agra district. It was 5483 hectares during the year 2000-2001. Even now, more than 4000 hectares of culturable waste land is lying unutilized in the district. Keeping in view the large population of landless and near landless people in the district, it would be rationale to use culturable waste land mainly for cultivation. While planning to increase tree cover in the district, it was proposed to do afforestation on 1.50 per cent of the area of culturable waste during each year from 2000-2001. But the main question remained that how much area of culturable waste can be used for agriculture. The officials of the Department of Agriculture, Government of Uttar Pradesh, expressed their concern that due to one reason or others, rise in net area sown could not be compatible with the increase in population in the district of Agra and the state of Uttar Pradesh. They cited the non-use of large area of culturable waste in the district over the years, as one of reasons for not increasing the net area sown. As far the decline in area of culturable waste during last five years, preceeding 2000-2001 is concerned, it has been around 5 per cent per annum. It was discussed with the officials of Department of Agriculture that looking into the trend of utilization of culturable waste in the past, how much area of the culturable waste should be diverted to the net area sown during each year upto 2009-2010. It was agreed upon that efforts should be made to divert around 6.50 per cent area of culturable waste during each year upto 2009-2010, keeping in view the size of the area of culturable waste in the district. On this basis, area of culturable waste would be reduced by 45 per cent during 2009-2010 than what was in 2000-2001. There would be a successive decline in the share of the area of culturable waste in reporting area of the district during each year from 2000-2001 to 2009-2010. The percentage of area of culturable waste

which was 1.38 in 2000-2001, would be reduced to 0.76 per cent by 2009-2010. In Table 5.6, a plan of utilization of culturable waste land in Agra district has been shown.

Table 5.6: **Proposed Plan for the Use of Culturable Waste in Agra District**

(in Hect.)					
Year	Culturable Waste	Area of Culturable Waste Diverted to Tree Cover	Area of Culturable Waste Diverted to Net Area Sown	Remaining Culturable Waste [(2-3)-4]	% of Reporting Area
1	2	3	4	5	6
2000-01	5483				1.38
2001-02	5483	82	270	5131	1.29
2002-03	5131	77	253	4801	1.21
2003-04	4801	72	236	4493	1.13
2004-05	4493	67	221	4205	1.06
2005-06	4205	63	207	3935	0.99
2006-07	3935	59	194	3682	0.93
2007-08	3682	55	181	3446	0.87
2008-09	3446	52	170	3224	0.81
2009-10	3224	48	159	3017	0.76

## **V.7 PLAN FOR THE PASTURE LAND**

The area under permanent pasture has been 919 hectares in the district in the year 2000-2001. But there has been nominal decline in this area over the years. Its share in the reporting area remained around 0.30 per cent upto the year 1990-91 and thereafter it declined to 0.23 per cent in the year 2000-2001. The decline in area of permanent pasture has been mainly due to encroachment for cultivation, despite the fact that there is Government Orders that area of pastures can not be diverted for other uses including for agricultural purposes. It is also a fact that whatever area is under pasture in

the district, that is insufficient to feed the growing population of livestock due to which several of the farmers have started growing various type of fodder crops on their cultivated area. It gives credence to our belief that existing area under pasture is insufficient to feed the population of livestock and any decline in this area during coming years would create a serious problem for feeding the livestock of the district. Therefore, in the proposed land use plan of Agra district, any diversion of the area under the pastures is to be restricted and upto the year 2009-2010, there should not be any decline in the area of 919 hectares of pasture land. It is to be ensured by the revenue officials and village panchayats.

#### **V.8 PLAN FOR THE MISCELLANEOUS TREES**

The area of miscellaneous trees indicates the area of old trees, orchards as well as new trees, orchards. The area of this land use category has experienced a sharp decline over the years. Moreover, the area under miscellaneous trees was small in district Agra. In 1980-81, area under miscellaneous trees was 1551 hectares which was reduced to only 919 hectares in the year 2000-2001. Even during last five years, area under miscellaneous trees suffered a decline by around 70 per cent. Given the small size of land area under miscellaneous trees and the importance of trees for healthy environment, meeting the needs of woods and horticulture, there seems to be no logic that any part of the area under miscellaneous trees should be diverted for other uses. Therefore, the act and government orders which prohibit the cutting of trees need to be implemented seriously during the coming years and at least the existing area of 919 hectares under the miscellaneous trees is to be kept untouched.

### **V.9 PLAN FOR CURRENT FALLOW**

In Agra district, large area has remained under the current fallow. During 2000-2001, around 10,500 hectares of land was under the current fallow. This trend has persisted since long as the share of the area under current fallow to the reporting area of the district during 2000-2001 was found to be 2.63 per cent. Therefore, it is needed that such area which has been the part of the net sown area, should not be left unutilized. In the past, there has been reduction in the area of fallow land by around 3 per cent in the district. Keeping in view the size of the area of current fallow and views of the officials of Department of Agriculture, it has been thought appropriate to utilize around 7 per cent of the area of both fallow land (current and old fallows) for cultivation. The share of each of the two fallow land proposed for utilization would be divided on the basis of proportionate share of each of the fallow land in total fallow land in the district. On this basis, around half of the area of current fallow of 10,468 hectares of 2000-2001 would be reduced by 2009-2010. The share of current fallow was 2.63 per cent in the year 2000-2001 in reporting area of the district which would be gradually diverted to the cultivated area over the years and it will come down to 1.23 per cent by the year 2009-2010. Besides, it has already been planned to use 0.50 per cent of area of the current fallow for increasing tree cover and for non-agricultural uses in Agra district during each year upto the year 2009-2010. The detailed plan of proposed utilization of current fallow of Agra district has been presented in Table 5.7.

Table 5.7: Proposed Plan for the Use of Current Fallow in Agra District

(in Hect.)

Year	Current Fallow	Area of Current Fallow Diverted for Tree Cover	Area of Current Fallow Diverted for Non-Agricultural Uses	Area of Current Fallow Diverted for Net Area Sown	Remaining Current Fallow Land {(2-3-4)-5}	% of Reporting Area
1	2	3	4	5	6	7
2000-01	10468	--	--	--	--	2.63
2001-02	10468	52	51	725	9640	2.42
2002-03	9640	48	52	665	8875	2.23
2003-04	8875	44	54	610	8167	2.05
2004-05	8167	41	56	560	7510	1.89
2005-06	7510	38	58	513	6901	1.73
2006-07	6901	35	60	470	6336	1.59
2007-08	6336	32	62	430	5812	1.46
2008-09	5812	29	64	393	5326	1.34
2009-10	5326	27	67	358	4874	1.23

#### **V.10 PLAN FOR OTHER FALLOW LAND**

The area of other fallow land which denotes the land that has not been cultivated for more than three-four years. In the year 2000-2001, land area under other fallow was around 6200 hectares in Agra district. Its percentage in reporting area of the district was around 2.15 per cent in the year 2000-2001. The available data suggested that the area of other fallow land did not demonstrate continuous decline over the years. At one point of time, there was decline in this area from previous year but at later years its area showed increasing trend. Since the area of other fallow land has been the part of the cultivated area, it has been decided to bring some of its area under cultivation during each year upto 2009-2010. As mentioned that seven per cent of area of both fallow land would be diverted to the cultivation during each year upto 2009-2010. The contribution

of each of the two fallow land in this seven percentage would be as per their proportionate shares in total fallow land of the district. In this way, as shown in Table 5.8, around 315 hectares of other fallow land would be diverted for use of cultivation by the year 2009-2010. Despite it, area of fallow land would remain around 2679 hectares in the district in 2009-2010. The percentage of other fallow land which was 1.55 in 2000-2001 would be reduced to 0.67 per cent in the year 2009-2010. Besides, diversion to the cultivated area, 1 per cent of its area has also been proposed for afforestation and in proportion to its share in total fallow land, for non-agricultural uses.

Table 5.8: **Proposed Plan for the Use of Other Fallow in Agra District**

(in Hect.)						
Year	Other Fallow	Area of Other Fallow Diverted for Tree Cover	Area of Other Fallow Diverted for Non-Agricultural Uses	Area of Other Fallow Diverted for Net Area Sown	Remaining Other Fallow Land ((2-3-4)-5}	% of Reporting Area
1	2	3	4	5	6	7
2000-01	6171	--	--	--	--	1.55
2001-02	6171	62	30	428	5651	1.42
2002-03	5651	57	31	398	5171	1.30
2003-04	5171	52	32	360	4727	1.19
2004-05	4727	47	33	330	4317	1.09
2005-06	4317	43	34	303	3937	0.99
2006-07	3937	39	35	277	3586	0.90
2007-08	3586	35	37	253	3261	0.82
2008-09	3261	33	38	231	2959	0.74
2009-10	2959	30	39	211	2679	0.67

### **V.11 PLAN FOR NET AREA SOWN**

A model of net area sown emerges from the proposed plan of other uses of land upto the year 2009-2010. As mentioned earlier that 0.50 per cent of the net sown area was proposed to be used for increasing tree cover in the district and 94.55 per cent of

the 4 per cent of its area was planned to be diverted for non-agricultural uses. Further, it was decided to reclaim 2 per cent of the barren land to be added in the net area sown. It was planned to bring 5 per cent of the culturable waste land under cultivation each year and 7 per cent area of both the fallows, according to their proportionate shares, was planned to be used for cultivation purposes. The resultant net area sown showed its share of 68.13 per cent in reporting area of the district in 2009-2010 from 72.51 per cent in the year 2000-2001. The net area sown of the Agra district would decrease by 17443 hectares (4.38 per cent in the reporting area) in the year 2009-2010 from 2000-2001. Reduction in net area sown may be by improving land productivity of agriculture and intensive farming would be required. In Table 5.9, proposed plan of net area sown for the period 2000-2001 to 2009-2010 has been presented.

**Table 5.9 : Proposed Plan for the Net Area Sown in Agra District**

(in Ha.)

Year	Net Area Sown	Net Area Sown Diverted for Tree Cover	Net Area Sown Diverted for Non-Agricultural Uses	Barren Land Added to Net Area Sown	Current Fallow Added to Net Area Sown	Other Fallow Added to Net Area Sown	Culturable Waste Added to Net Area Sown	Total Net Area Sown (2-3-4+5+6+7+8)	Percentage of Reporting Area
1	2	3	4	5	6	7	8	9	10
2000-01	288640	--	--	--	--	--	--	--	72.51
2001-02	288640	1443	1398	42	270	725	428	287264	72.17
2002-03	287264	1436	1448	41	253	665	392	285731	71.78
2003-04	285731	1429	1498	39	236	610	360	284049	71.36
2004-05	284049	1420	1550	38	221	560	330	282228	70.90
2005-06	282228	1411	1604	36	207	513	303	280272	70.41
2006-07	280272	1401	1659	35	194	470	277	278188	69.89
2007-08	278188	1391	1717	33	181	430	253	275977	69.33
2008-09	275977	1380	1777	32	170	343	231	273646	68.75
2009-10	273646	1369	1839	31	159	358	211	271197	68.13

## **CHAPTER – VI**

### **MODEL LAND USE PLAN OF AGRA DISTRICT**

In the previous chapter, a plan has been prepared for the utilization of land for varying purposes in Agra District from the year 2000-2001 to 2009-2010. The plan has been prepared on three pragmatic considerations. First is the past changes in land use pattern in each of the nine classifications of land use. Second is the progress and plan of the concerned departments for the management of different uses of land and consideration of financial implications involved. Third is the assessment of the situation that to what extent the past trends and achievements of the concerned departments would be agglomerated to arrive at the situation which shall be closer to the reality. In fact, we did our best of endeavours to prepare the proposed plan of different uses of land more realistic so that it could be implemented by the concerned departments.

#### **VI.1 FRAMEWORK OF THE PLAN**

The following framework was developed to prepare the Model Land Use Plan of the Agra District:

Table 6.1: **Framework of Model Land Use Plan**

Sl.No.	Land Use Category	Constituents of Proposed Land Use Plan of each category (2000-2001 to 2009-2010)
1.	Reporting Area	Constant
2.	Forest	Existing area + 0.50 per cent area of Net Area Sown + 2 per cent area of barren land + 0.50 per cent area of Non-Agricultural Uses + 1.50 per cent area of culturable waste + 0.50 per cent area of current fallow and 1 per cent area of other fallow.
3.	Barren Land	Existing area – 35 per cent rocky and ravines – 2 per cent went to Forest – 2 per cent went to Net Area Sown.
4.	Land Under Non-Agricultural Uses	Existing area – 0.50 per cent went to Forest + 4 per cent area of current, other and net area sown (Share of 4 per cent in each category, 3.43, 2.02 and 94.55 per cent).
5.	Culturable Waste	Existing area – 1.50 per cent area went to Forest – 5 per cent area diverted went to Net Area Sown
6.	Permanent Pasture	Constant
7.	Miscellaneous Trees	Constant
8.	Current Fallow	Existing area – 0.50 percent went to Forest – 3.43 per cent of share of 4 per cent went to non-agricultural uses – 62.91 per cent to be diverted to Net Area Sown as per Share of the Current Fallow in Total Fallow
9.	Other Fallow	Existing area – 1.0 per cent area went to Forest – 2.02 percent share of 4 per cent went to non-agricultural uses – 37.07 per cent share of 7 per cent of Total Fallow land went to Net Area Sown.
10.	Net Area Sown	Existing area – 0.50 per cent went to Forest – 94.55 per cent of share of 4 per cent went to non-agricultural uses + 2 per cent from Barren Land + 5 per cent from Culturable Waste + 7 per cent of both fallows.

## VI.2 LAND USE PLAN OF AGRA DISTRICT

On the basis of above framework, area under forest which is to be referred as area under tree cover was 11.41 per cent in the reporting area during the year 2000-2001 in the district, shows continuous increasing trend and it reaches to 15.50 per cent of the reporting area by the year 2009-2010. Though by the year 2009-2010, area under tree cover would be lower than the recommended norm of 30 per cent as envisaged in the

National Forest Policy, but further increase beyond 14 per cent of tree cover would not be possible to achieve in the district, taking into consideration all the factors involved.

The plan reveals continuous decline in the area of barren land from 2000-2001 to 2009-2010. Its percentage in reporting area of the district was 0.84 per cent and it will come down to 2.88 per cent.

As the urbanization and industrialization are increasing, proposed area under non-agricultural uses would also increase in the district from 9.34 per cent in the year 2000-2001 to 12.70 per cent during the year 2009-2010.

The percentage of area of culturable waste was 1.38 per cent in reporting area of the district in 2000-2001. It has been planned that it would be largely converted to the cultivation and its share would be reduced to 0.76 per cent upto the year 2009-2010.

No change in the area of permanent pasture land and miscellaneous trees has been proposed and it has been recommended that concerned departments should strive to maintain the status-quo of the existing area of both these uses of land.

The area under current fallow was 2.63 per cent in the year 2000-2001. It has been planned to reduce the area of current fallow by 7 per cent in the year 2009-2010. The reduced area would be largely diverted to the net area sown in respective years. The similar plan was proposed in case of other fallow land.

The proposed plan of utilization of eight categories of uses of land has bearing on the net area sown. The percentage of net area sown in the reporting area of Agra district was 72.51 per cent in the year 2000-2001. Due to shifting of area within eight uses of land categories, net area sown would decrease nominally in successive years

after 2000-2001 and its share in reporting area would decrease to 68.13 per cent in the year 2009-2010. In the following Table 6.2, proposed Model Land Use Plan of Agra District for the period 2001-2002 to 2009-2010 has been shown.

Table VI.2: **Model Land Use Plan of Agra District: 2000-2001 to 2009-2010**

(in Hect.)

Land Use Category	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
Reporting Area	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)	398060 (100.00)
Forest	45437 (11.41)	47305 (11.89)	49158 (12.35)	50994 (12.81)	52813 (13.27)	54618 (13.72)	56407 (14.17)	58182 (14.62)	59945 (15.06)	61694 (15.50)
Barren Land	3325 (0.84)	3240 (0.81)	3157 (0.79)	3078 (0.77)	3002 (0.75)	2929 (0.74)	2859 (0.72)	2792 (0.70)	2727 (0.68)	2665 (0.67)
Land Under Non-Agricultural Uses	37166 (9.34)	38459 (9.66)	39797 (10.00)	41182 (10.35)	42615 (10.71)	44098 (11.08)	45632 (11.46)	47220 (11.86)	48863 (12.28)	50564 (12.70)
Culturable Waste	5483 (1.38)	5131 (1.29)	4801 (1.21)	4493 (1.13)	4205 (1.06)	3935 (0.99)	3682 (0.93)	3446 (0.87)	3224 (0.81)	3017 (0.76)
Permanent Pasture	919 (0.23)	919 (0.23)	919 (0.23)	919 (0.23)	919 (0.23)	919 (0.23)	919 (0.23)	919 (0.23)	919 (0.23)	919 (0.23)
Miscellaneous trees	451 (0.11)	451 (0.11)	451 (0.11)	451 (0.11)	451 (0.11)	451 (0.11)	451 (0.11)	451 (0.11)	451 (0.11)	451 (0.11)
Current Fallow	10468 (2.63)	9642 (2.42)	8875 (2.23)	8167 (2.05)	7510 (1.89)	6901 (1.73)	6336 (1.59)	5812 (1.46)	5326 (1.34)	4874 (1.23)
Other Fallow	6171 (1.55)	5651 (1.42)	5171 (1.30)	4727 (1.19)	4317 (1.09)	3937 (0.99)	3586 (0.90)	3261 (0.82)	2959 (0.74)	2679 (0.67)
Net Area Sown	288640 (72.51)	287264 (72.17)	285731 (71.78)	284049 (71.36)	282228 (70.90)	280272 (70.41)	278188 (69.89)	275977 (69.33)	273646 (68.75)	271197 (68.13)

Annexure: Land Use Pattern in Agra District

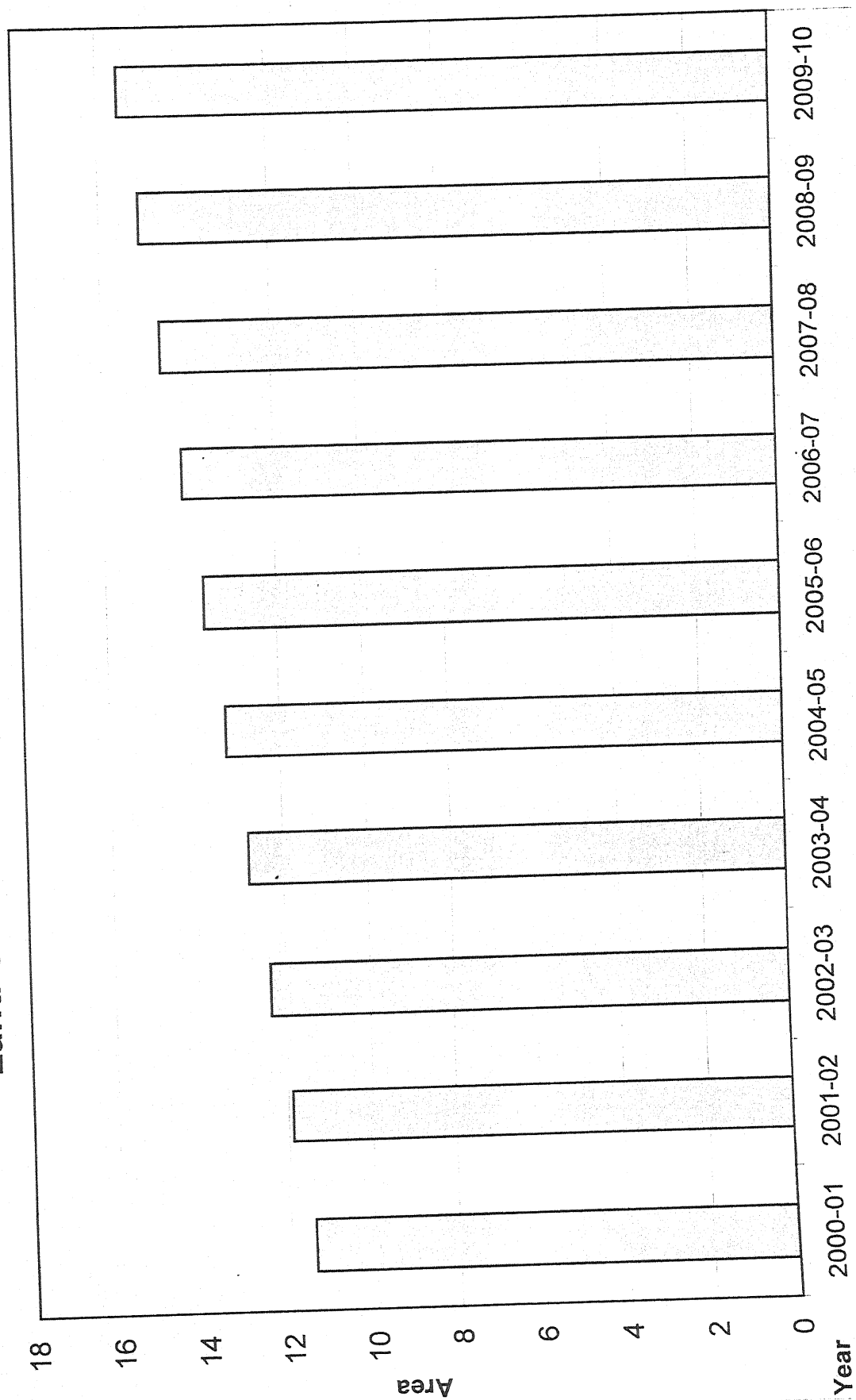
(Hect.)

Year	Land Use Categories									
	Reporting Area	Forest	Barren Land	Land Under Non-Agricultural Uses	Culturable Waste	Permanent Pasture	Miscellaneous Trees	Current Fallow	Other Fallow	Net Area Sown
1970-71	485393 (100.00)	40138 (8.27)	18969 (3.91)	32770 (6.75)	15036 (3.10)	1356 (0.28)	2538 (0.52)	12144 (2.50)	6711 (1.38)	355731 (73.29)
1972-73	483969 (100.00)	39739 (8.21)	17382 (3.59)	33030 (6.83)	15153 (3.13)	1456 (0.30)	3435 (0.71)	12303 (2.54)	6081 (1.26)	355390 (73.43)
1974-75	481509 (100.00)	40300 (8.37)	15683 (3.26)	33611 (6.98)	13783 (2.86)	1461 (0.30)	2117 (0.44)	9326 (1.94)	7970 (1.66)	357258 (74.19)
1975-76	481606 (100.00)	40036 (8.31)	15015 (3.12)	33865 (7.03)	13687 (2.84)	1501 (0.31)	3450 (0.72)	14049 (2.92)	7127 (1.48)	352876 (73.27)
1976-77	479925 (100.00)	39620 (8.25)	13669 (2.85)	33758 (7.03)	11966 (2.49)	1320 (0.28)	2511 (0.52)	13568 (2.83)	7470 (1.56)	356043 (74.19)
1977-78	482555 (100.00)	42373 (8.78)	13418 (2.78)	33931 (7.03)	11482 (2.38)	1265 (0.26)	2075 (0.43)	14711 (3.05)	8377 (1.74)	354923 (73.55)
1978-79	482384 (100.00)	42373 (8.78)	13682 (2.84)	34012 (7.05)	11367 (2.36)	1181 (0.24)	1695 (0.35)	14066 (2.92)	8587 (1.78)	355421 (73.68)
1979-80	479373 (100.00)	39550 (8.25)	13782 (2.87)	34803 (7.26)	11114 (2.32)	1091 (0.23)	1181 (0.25)	40680 (8.49)	9902 (2.06)	327270 (68.27)
1980-81	476663 (100.00)	39550 (8.30)	13170 (2.76)	35318 (7.41)	8431 (1.77)	1171 (0.24)	1551 (0.33)	26472 (5.55)	10038 (2.11)	340962 (71.53)
1981-82	476523 (100.00)	39442 (8.28)	12867 (2.70)	35855 (7.52)	8888 (1.86)	1268 (0.27)	1875 (0.39)	20065 (4.21)	10082 (2.12)	346181 (72.65)
1982-83	476787 (100.00)	39616 (8.31)	12867 (2.70)	37804 (7.93)	7018 (1.47)	1464 (0.31)	1637 (0.34)	17852 (3.75)	14031 (2.94)	344498 (72.25)
1983-84	476787 (100.00)	39616 (8.31)	13217 (2.77)	37978 (7.97)	6718 (1.41)	1384 (0.29)	1308 (0.27)	18569 (3.89)	10860 (2.28)	347137 (72.81)
1984-85	476787 (100.00)	39616 (8.31)	13502 (2.83)	38190 (8.01)	6188 (1.30)	1225 (0.25)	1566 (0.33)	19751 (4.14)	11049 (2.32)	345700 (72.51)
1985-86	477537 (100.00)	39616 (8.30)	14800 (3.10)	38596 (8.08)	6698 (1.40)	1263 (0.26)	1270 (0.27)	16956 (3.55)	12498 (2.62)	345840 (72.42)
1986-87	477274 (100.00)	39617 (8.30)	14730 (3.09)	39074 (8.19)	6598 (1.38)	1223 (0.26)	1209 (0.25)	18484 (3.87)	13188 (2.76)	343151 (71.90)
1987-88	477274 (100.00)	39617 (8.30)	14730 (3.09)	39074 (8.19)	6598 (1.38)	1223 (0.26)	1209 (0.25)	18484 (3.87)	13188 (2.76)	343151 (71.90)

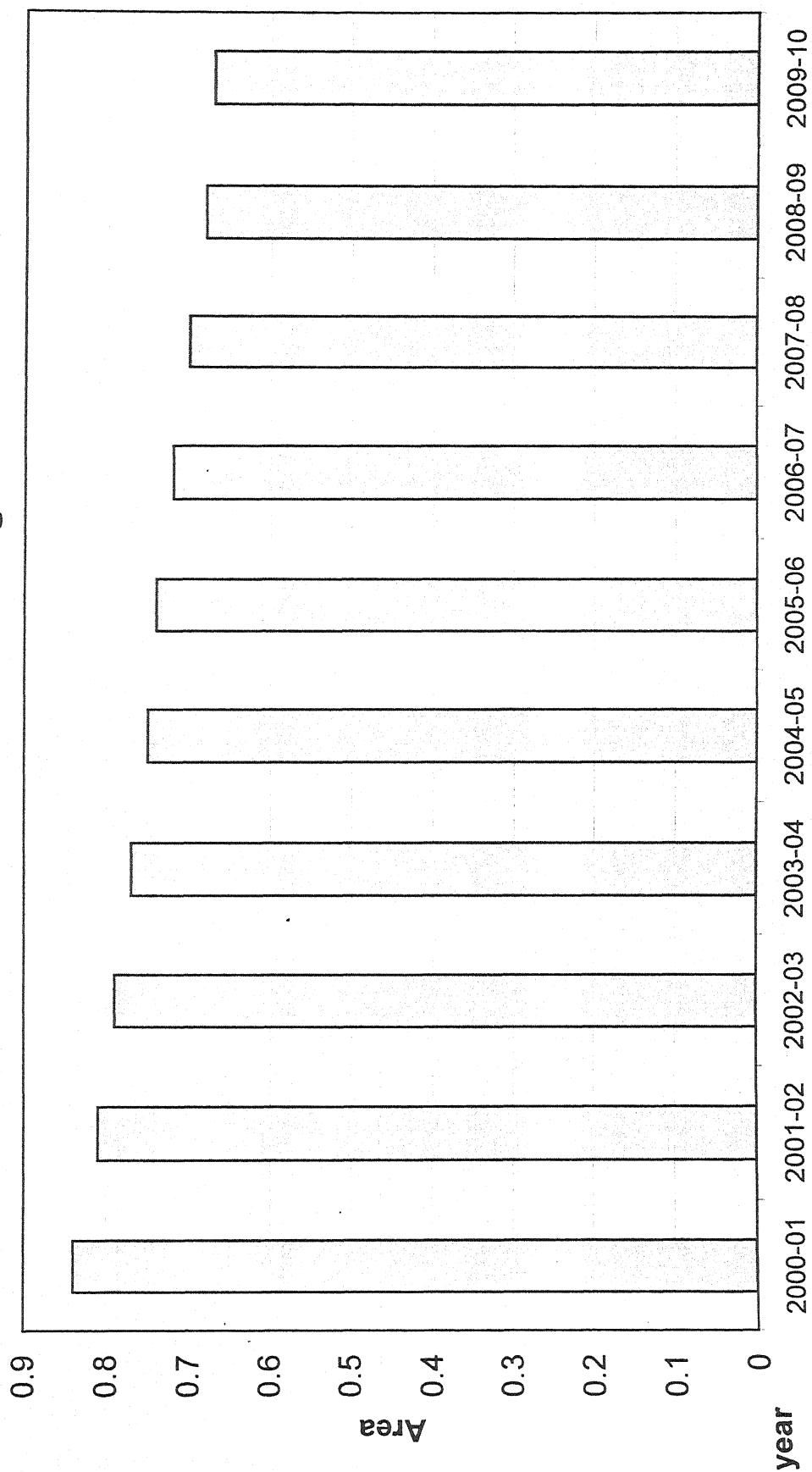
Annexure (contd.....)

Year	Land Use Categories									
	Reporting Area	Forest	Barren Land	Land Under Non-Agricultural Uses	Culturable Waste	Permanent Pasture	Miscellaneous Trees	Current Fallow	Other Fallow	Net Area Sown
1988-89	477274 (100.00)	39847 (8.35)	14730 (3.09)	39074 (8.19)	6368 (1.33)	1223 (0.26)	1209 (0.25)	18484 (3.87)	13188 (2.76)	343151 (71.90)
1989-90	398816 (100.00)	34192 (8.57)	11754 (2.95)	33595 (8.42)	6410 (1.61)	1130 (0.28)	1313 (0.33)	15143 (3.80)	13151 (3.30)	282128 (70.74)
1990-91	399016 (100.00)	34479 (8.64)	6393 (1.60)	34003 (8.53)	12115 (3.04)	1150 (0.29)	1363 (0.34)	14588 (3.66)	10027 (2.51)	284838 (71.39)
1991-92	399696 (100.00)	35488 (8.88)	7008 (1.75)	34596 (8.66)	11929 (2.98)	1148 (0.29)	1029 (0.26)	14678 (3.67)	11004 (2.75)	282816 (70.76)
1992-93	399734 (100.00)	35526 (8.89)	6713 (1.68)	34577 (8.65)	11938 (2.99)	1140 (0.29)	1056 (0.26)	15242 (3.81)	10920 (2.73)	282622 (70.70)
1993-94	399734 (100.00)	35527 (8.89)	6995 (1.75)	34775 (8.70)	11876 (2.97)	1126 (0.28)	792 (0.20)	12420 (3.10)	9469 (2.37)	286754 (71.74)
1994-95	403787 (100.00)	39325 (9.74)	6822 (1.69)	35214 (8.72)	11809 (2.92)	1094 (0.27)	670 (0.17)	12181 (3.02)	9741 (2.41)	286931 (71.06)
1995-96	403819 (100.00)	39510 (9.79)	6948 (1.72)	35505 (8.79)	11647 (2.88)	1056 (0.26)	646 (0.16)	13990 (3.46)	9816 (2.44)	284701 (70.50)
1996-97	401119 (100.00)	35510 (8.85)	7144 (1.78)	36919 (9.20)	11355 (2.83)	973 (0.24)	631 (0.16)	11425 (2.85)	9463 (2.36)	287699 (71.73)
1997-98	398145 (100.00)	33960 (8.53)	6701 (1.68)	36156 (9.08)	11114 (2.79)	972 (0.24)	668 (0.17)	11961 (3.01)	8282 (2.08)	288331 (72.42)
1998-99	398015 (100.00)	33960 (8.53)	6760 (1.70)	36639 (9.21)	10802 (2.72)	967 (0.24)	598 (0.15)	12900 (3.24)	8126 (2.04)	287263 (72.17)
1999-2000	398015 (100.00)	33940 (8.53)	6518 (1.64)	36744 (9.23)	10765 (2.71)	969 (0.24)	576 (0.14)	12873 (3.23)	8128 (2.04)	287502 (72.24)
2000-01	398060 (100.00)	45437 (11.41)	3325 (0.84)	37166 (9.34)	5483 (1.38)	919 (0.23)	451 (0.11)	10468 (2.63)	6171 (1.55)	288640 (72.51)

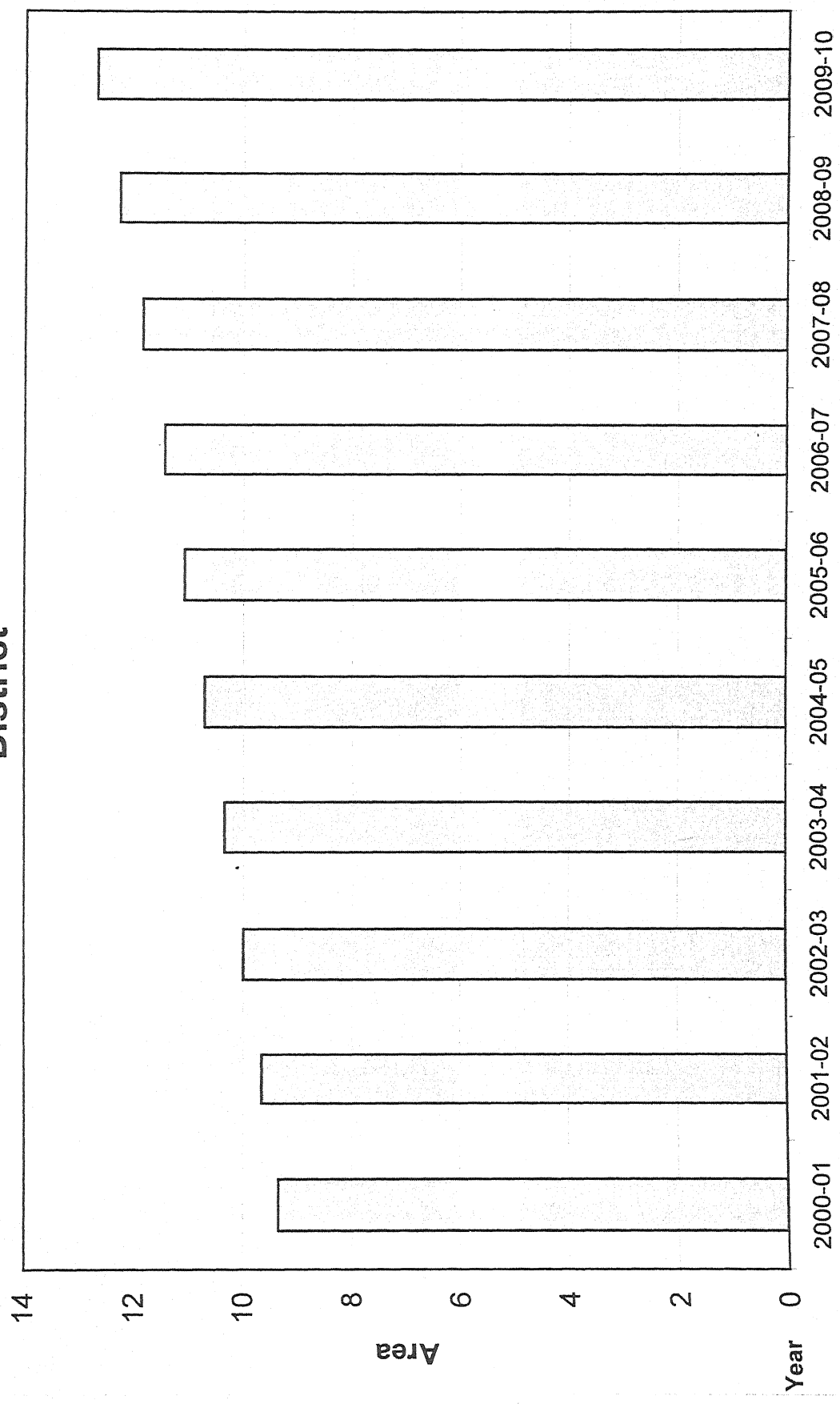
Land Use Plan of Forest -Agra District



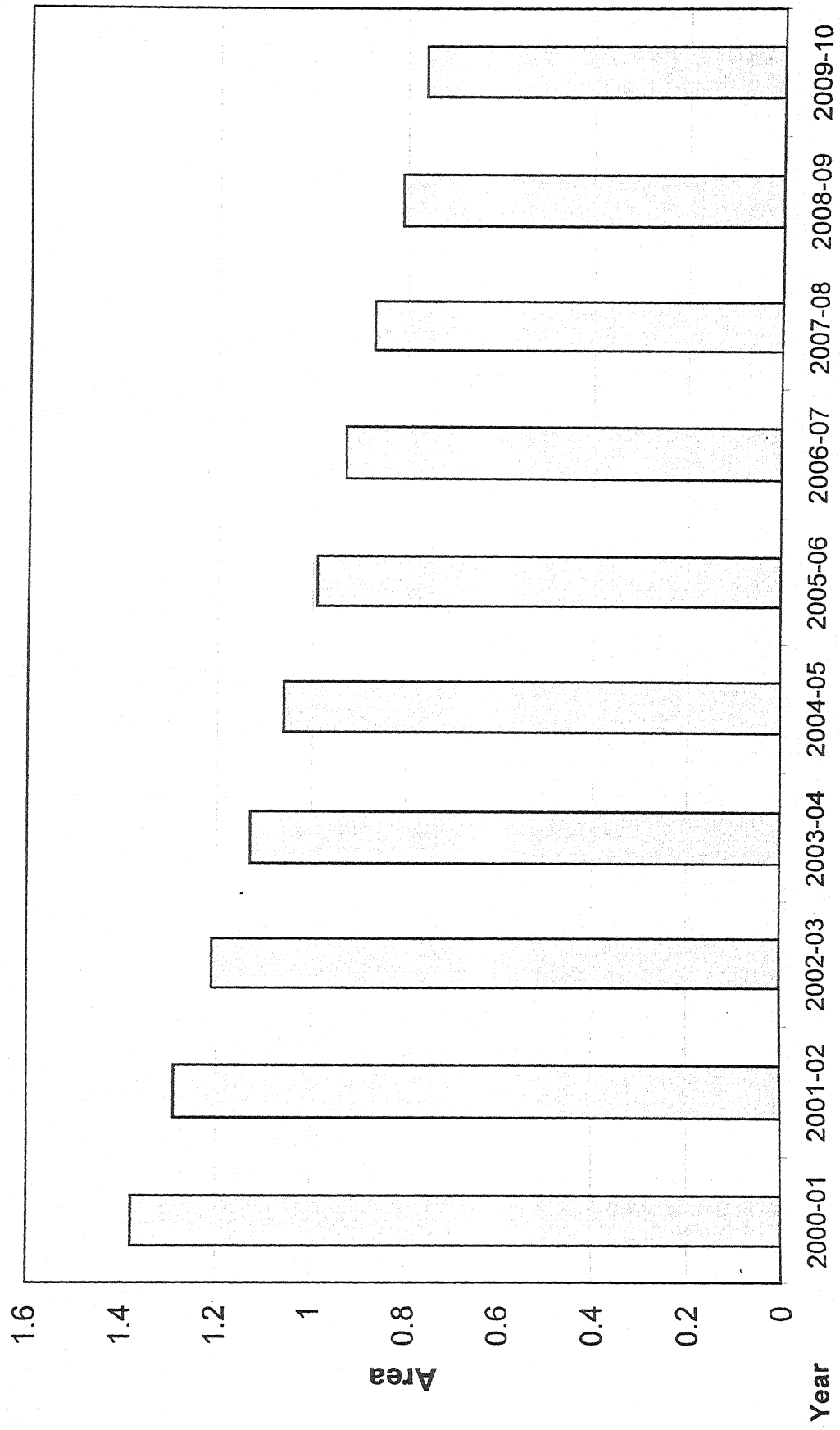
# Land Use Plan of Barren Land-Agra District



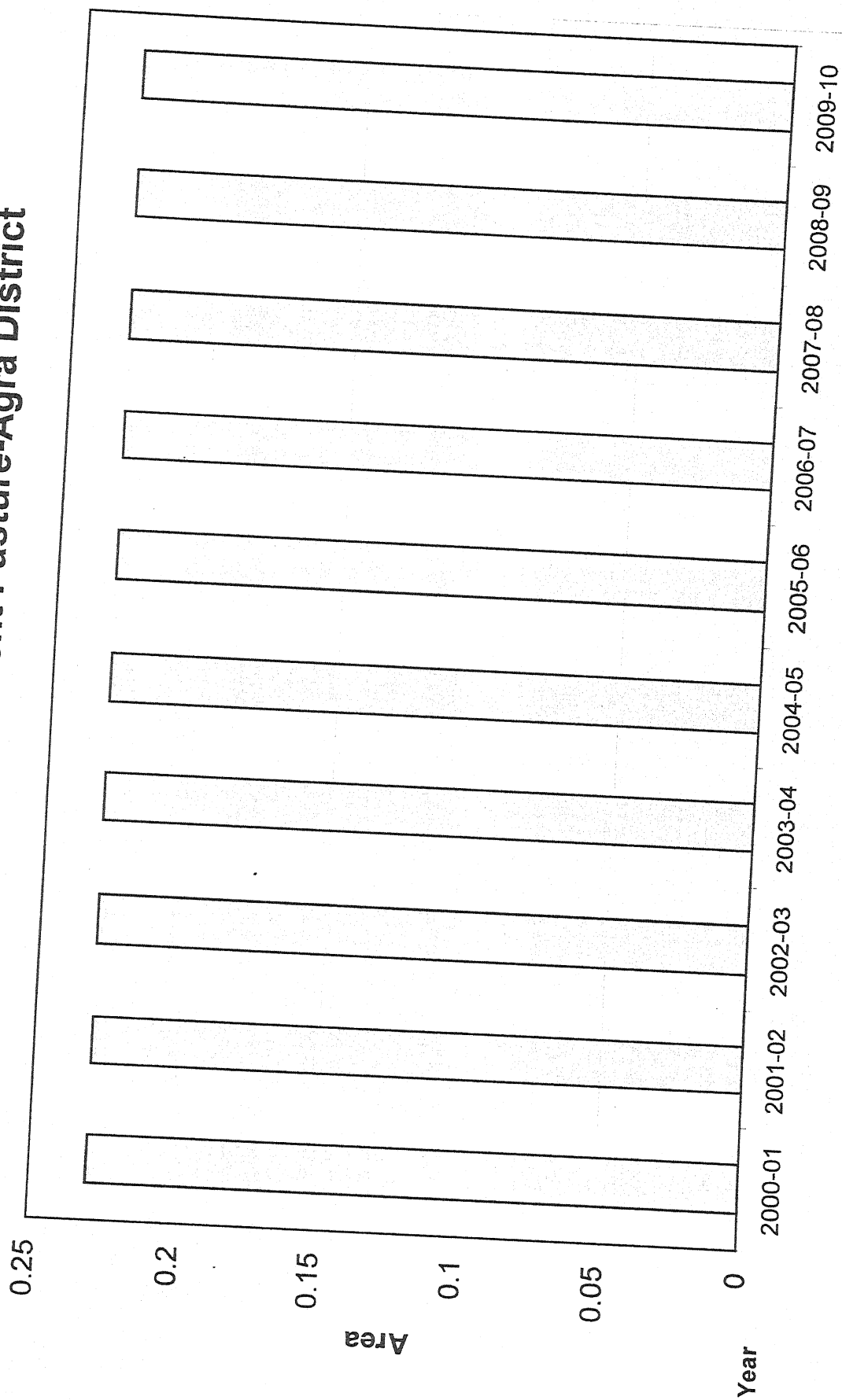
Land Use Plan of Land Under Non-Agricultural Uses-Agra District



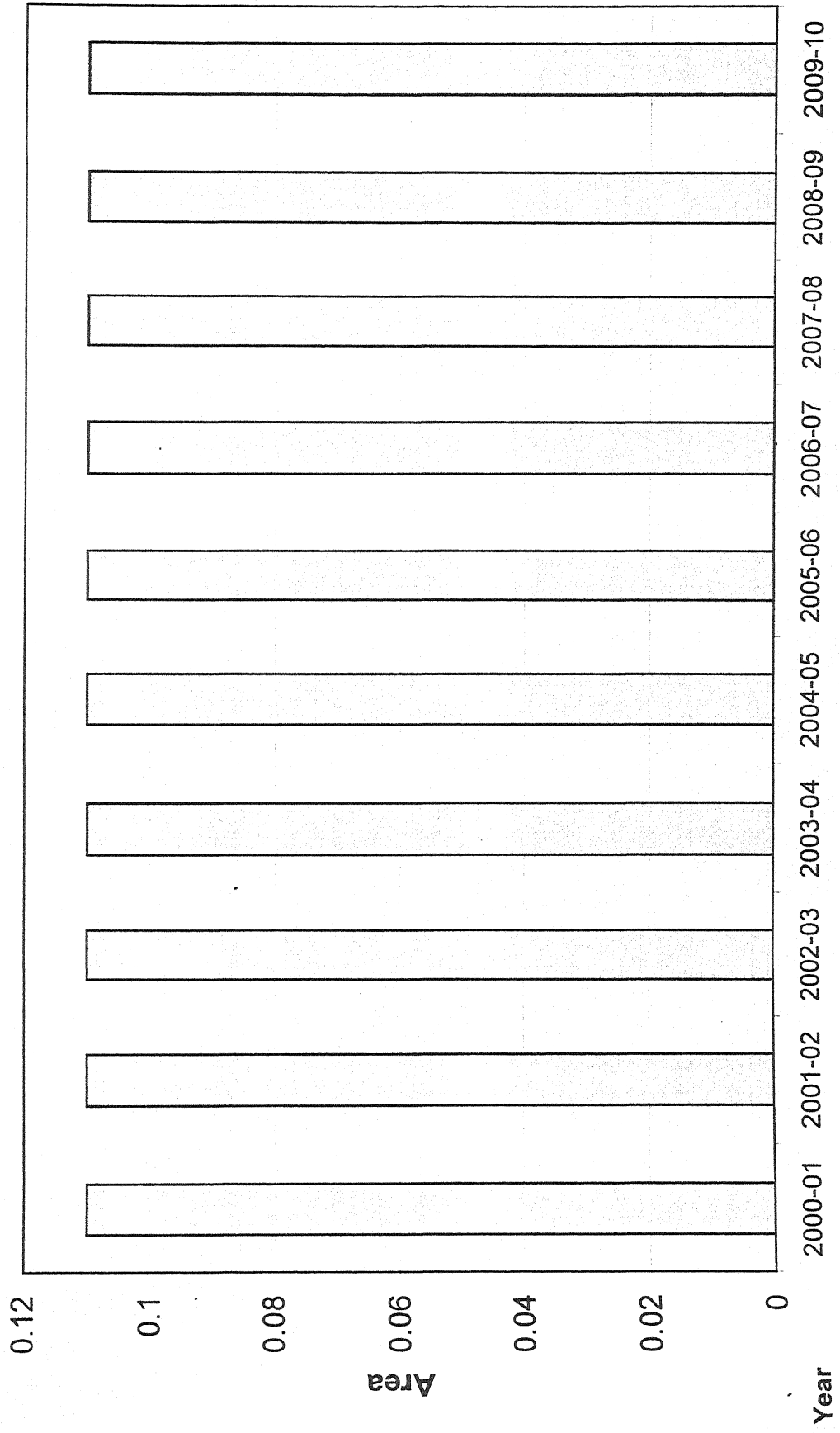
## Land Use Plan of Culturable Waste-Agra District



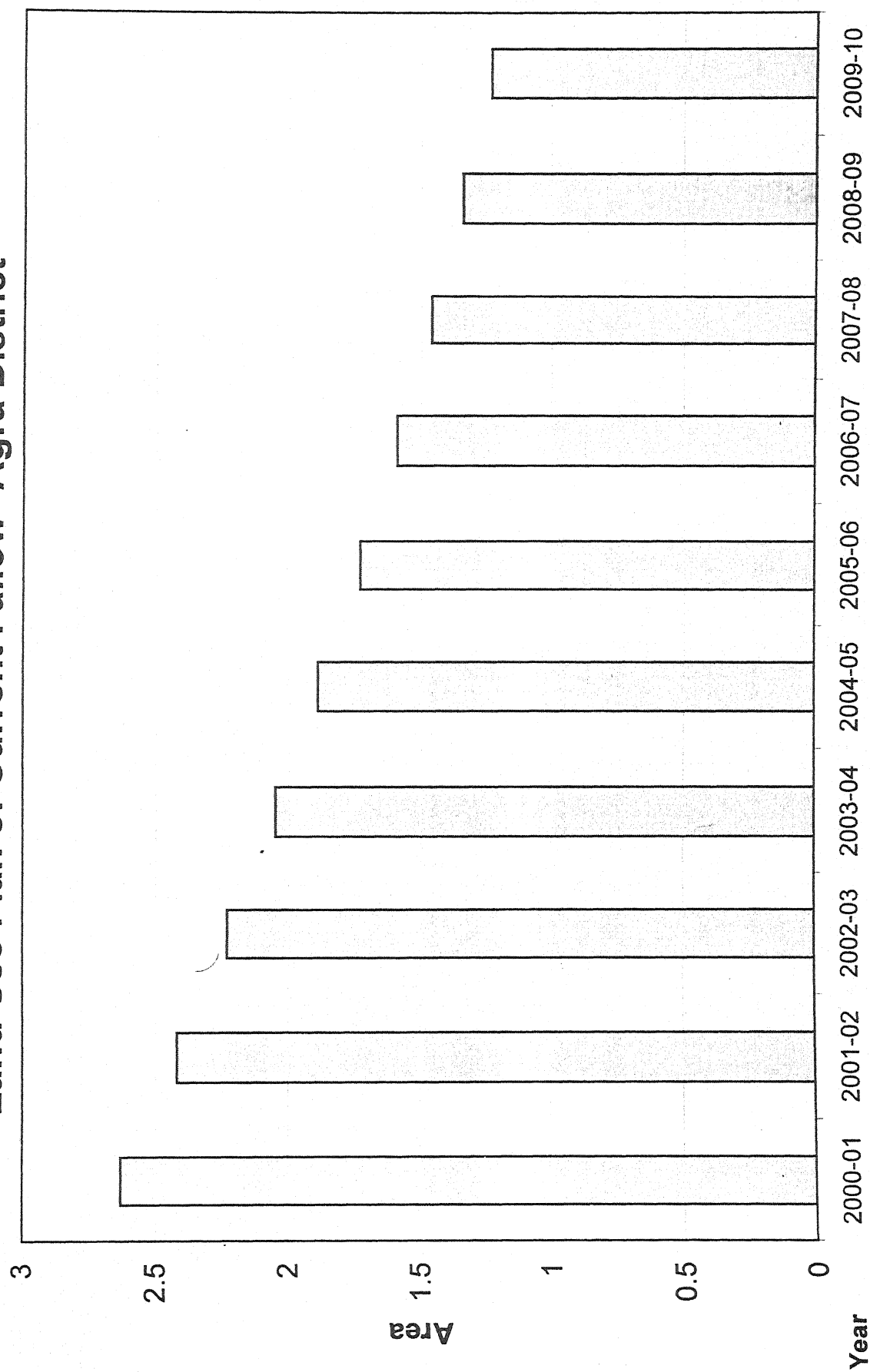
# Land Use Plan of Permanent Pasture-Agra District



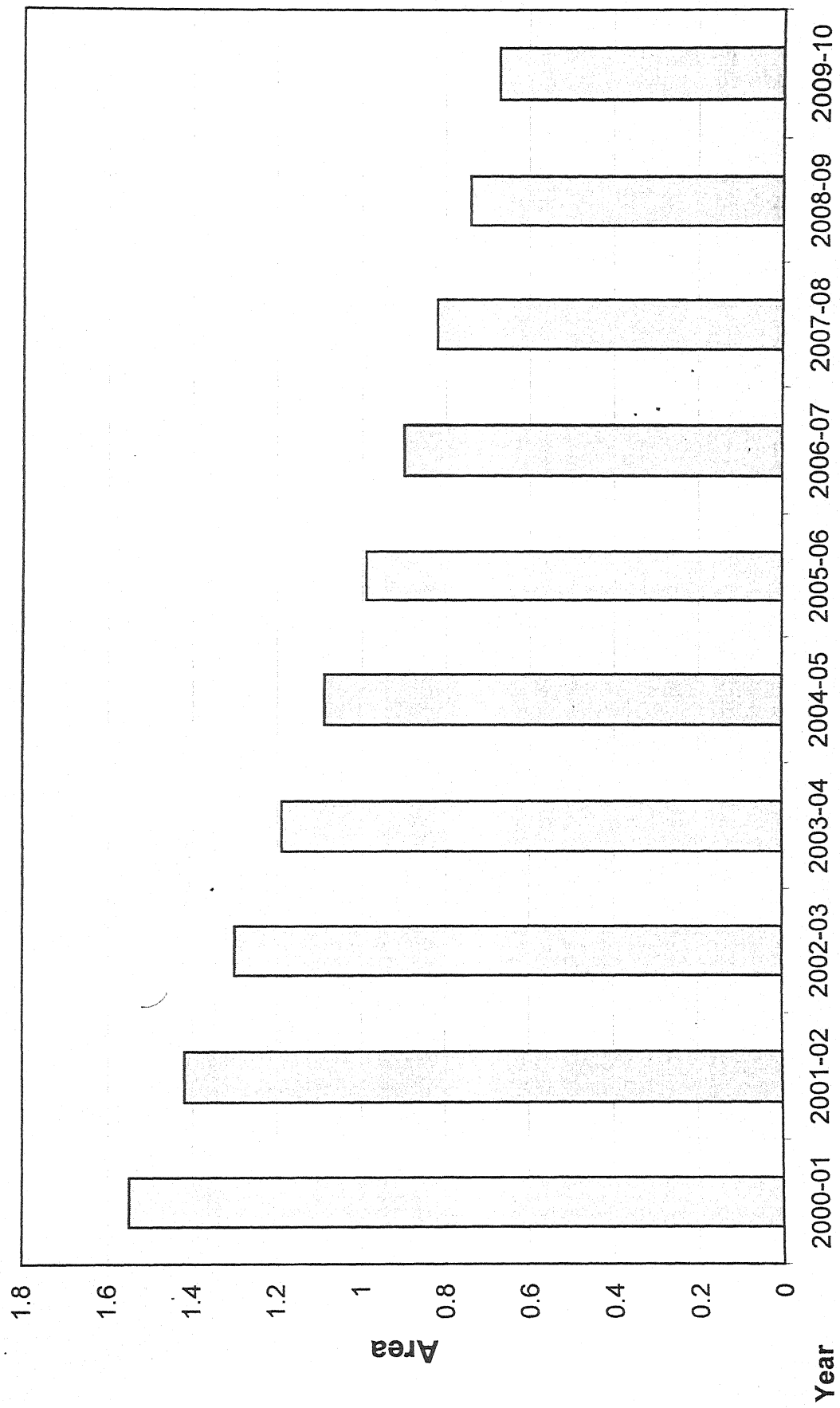
# Land Use Plan of Miscellaneous Trees-Agra District



# Land Use Plan of Current Fallow -Agra District



## Land Use Plan Other Fallow- Agra District



# Land Use Plan of Net Area Sown-Agra District

